Banking Reform and Economic Development in Post-1978 China: Towards a Synthesis of Competing Theoretical Perspectives

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Abstract

This thesis presents a detailed analysis of China's banking reforms and their interactive relationship with economic development, starting in 1978.

Developing a synthesized analytical framework, this thesis examines and verifies the applicability and feasibility of several competing theoretical perspectives within the Chinese context. These include the aspects of monetization, financial liberalization, allocative efficiency view of finance (according to the neoclassical doctrine), and productive efficiency view of finance (from the Keynesian–Schumpeterian view of endogenous credits creation).

This thesis argues that these perspectives consider only one dimension of China's financial development, and that such a generalized view is unsuitable. Additionally, as China's transitional economy still has strong market-supplanting attributes, studying China's financial development and its interactive role with real sector development post-1978 from a purely neoliberal, market-criteria lead to bias and distortion.

This thesis investigates China's evolving financial reform primarily from the aspects of monetization, financial liberalization, and functional view of finance. It emphasizes the interactions between the function of resources allocation, which draws on the existence of market frictions found in the mainstream doctrine, and the function of credit creation, found in the post-Keynesian endogenous finance theory of development. This thesis undertakes both a qualitative and quantitative analysis of China's financial sector.

This thesis finds that it is the complementarity of the productive efficiency and the allocative efficiency that explains the seemingly confusing phenomenon that an inefficient financial system, according to purely commercial criteria, has successfully supported China's economic development over the last 30 years.

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List of Abbreviations

ABC: Agriculture Bank of China

AMC: Asset Management Companies

BOC: Bank of China

BOCOM: Bank of Communication

CAR: capital adequacy ratio

CBRC: China Banking Regulatory Commission

CCBs: City Commercial Banks

CCB: China Construction Bank

CIRC: China Insurance Regulatory Commission

CSRC: China Securities Regulatory Commission

DLR: deposits-to-loans ratio

FDI: foreign direct investment

FIC: financial intermediation control

FRI: financial repression index

GMM: generalized method of moments

ICBC: Industrial and Commercial Bank of China

ICOR: incremental capital-output ratio

IVA: Industrial Value-Added

JSCBs: joint-stock commercial banks

LBR: bank loans over the state budget

NDRC: National Development and Reform Commission

PBOC: People's Bank of China

PCA: principal component analysis

PIM: perpetual inventory method

RCCs: Rural Credit Co-operatives

RDI: real deposit interest rates

ROA: Return on Assets

ROE: Return on Equity

SIR: savings-to-investment ratio

SOBs: state-owned banks

SOEs: state-owned enterprises

SRC: savings retention coefficient

SRF: self-raising funds in total social fixed investment

TICs: Trust and Investment Corporations

TFP: total factor productivity

TPP: total price performance

TVEs: Township and Village Enterprises

UCCs: Urban Credit Co-operatives

Yi Hang San Hui (one (central) bank and three commissions)

Zhua Da Fang Xiao (grasping the large and letting the small go)

Chapter 1

Introduction

The relationship between financial development and economic growth has been a long-term controversial issue, and has received significant attention from economists. In early economic growth studies, following Keynes's general theory — in which the importance of financial consideration, called a "state of confidence," was assumed insufficient to affect economic activities and investment decisions — financial systems had neither a clear nor detailed role in output determination. Gertler (1988) points out that most of the early macroeconomics literature ignored the potential relationship between the performance of credit markets and output levels.

In Goldsmith (1969), McKinnon (1973), and Shaw (1973), there is considerable evidence to indicate a relationship between financial development and economic growth. However, even being inspired by, among others, the model of financial repression and theoretical and empirical research, it was not until the 1990s that new growth theories were developed and several new econometrical methods were introduced. In this wave of work, financial intermediations were treated as endogenous determinants in the growth models, as most studies looked at the internal linkages between finance development and economic growth. However, while a positive relationship was confirmed in most of the literature of the last 20 years, the causality between finance and growth remains unclear. In addition, the channels—the ways in which financial development affects economic growth—remain controversial.

Following the model of financial repression, introduced by McKinnon (1973) and Shaw (1973), new growth theories (comprising endogenous growth models) focus on the importance of financial systems in economic growth by illustrating how financial intermediations efficiently allocate resources. A basic assumption is the existence of market frictions, such as informational asymmetry and transaction costs. In this framework, several related functions of financial systems, such as pooling savings, acquiring information, allocating resources, managing risks, and monitoring corporate governance, can be distinguished and classified under aggregated functions of allocative efficiency (see Levine, 1997, 2005; Merton, 1992; Merton & Bodie, 1995, 2005).

For the most part, the productive efficiency view of financial development is advocated by post-Keynesian economists (e.g., Davidson, 2002; Lavoie, 1984, 2006). It was Schumpeter (1934) who first proposed that creating money is a role that only banks perform. Keynes (1937) highlighted the role of money in finance when he introduced "finance motive" as one of the four reasons for needing money. With the development of the Keynesian–Schumpeterian view of endogenous money and endogenous finance, the productive efficiency view illustrates that the main function financial systems play in accelerating economic growth is to create money and credits to the market, not to overcome market frictions.

In the framework of allocative efficiency, the role finance plays in economic development is from a qualitative perspective, while in the Keynesian–Schumpeterian framework of productive efficiency, it is from a quantitative perspective. Although there are several distinct differences between how these two frameworks use the functions of financial systems, the relationship between allocative efficiency and productive efficiency is complementary, not substitutive. On the one hand, through the function of

creating money, productive investment in the economy is facilitated through credits expansion. On the other hand, the function of resource allocation facilitates resources more efficiently into firms' investment. To be clear, it is difficult to explicitly distinguish which part of financial growth is contributed by which efficiency, and existing studies have made little effort to explore whether economic growth is more sensitive to one efficiency than the other. Understanding how the efficiencies effect economic development would provide a better understanding of the role of financial systems, as well as of financial development, on economic determination.

Along with the continuously changing theoretical debate on the finance–growth nexus over the past 20 years, empirical research objectives have also been changing. The original financial repression theories by McKinnon (1973) and Shaw (1973) concerned the phenomenon of financial repression in developing countries, usually referred to as less developed countries (LDCs). However, though the emergence of the functional view of financial development builds upon endogenous financial intermediations, research objectives switched to a more global outlook. Influential empirical applications during this wave (e.g., Beck, Levine, & Loayza, 2000; King & Levine, 1993a, 1993b, 1993c; Levine, Loayza, & Beck, 2000) used a global-level cross-country dataset. No particular concentration was given to any economic group, and all economies were treated as universal in the application of finance–growth theories.

Even if a worldwide positive finance–growth nexus is confirmed, related policy implications for developing economies would most likely be different from that of developed economies. "Well-functioning" financial systems, from a Western perspective, are usually absent in the developing world. To a certain extent, financial development in developing economies can be understood by the term "financial reform";

reforms first comprise the construction of a fully functioning financial system, followed by financial development through diversification, sophistication, and further prudential regulations. There are no exceptions to this process; and as a typical developing economy, financial development in China followed this path.

China started its economic reform in 1978 by adopting a more liberal economic system. Price liberalization, enterprise reforms, and financial sector reforms were introduced, and along with other reforms, significant development and changes were achieved. The most remarkable, and fundamental, change was that China switched its economy from an administrative model to its own specialized market–socialist model. As a result, China has had an average annual growth rate of more than 9 percent over the last 30 years, and became the world's second-largest economy following the global financial crisis in the late 2000s. Using Purchasing Power Parity, an oft-used method to conduct relative price estimation, it is expected that in the next ten years China will overtake the United States to become the world's largest economy, if China maintains this growth rate.

Financial sector reforms have been vital in China's economic growth. The transformation of investment institutions from administrative-based to market-based has been challenging, and overall the process can be understood as a gradual increase in liberalization, commercialization, and internationalization. The former Soviet-style mono-banking system was gradually replaced by a market-oriented, two-tiered financial system, though the People's Bank of China (PBOC) remains the central bank, even after promulgation of the Central Bank Law and the Commercial Bank Law in 1995. The big

four state-owned banks[1] (SOBs) continue to dominate the banking sector and the financial system, so clearly state influence remains strong. However, China's stock market, launched in the early 1990s with the establishment of the Shanghai Stock Exchange and Shenzhen Stock Exchange, has grown rapidly, providing a substantial channel for firms to raise funds. It should be noted, though, that the exchanges comprise a small percentage of financial activities. In other words, the stock market in China, from the perspective of financial activities, is not as important as the banking sector.

In studies at the nexus of finance and growth, China receives comparatively little attention. Though it is one of the most important developing countries in the world, it is usually excluded in cross-country empirical studies. The reason for this, though, is that there is a lack of available data. For example, there is no official source for M3 data (i.e., liquid liabilities, or broad money), which is widely used as a major financial development indicator in empirical studies. Additionally, the results of empirical studies that do include China are mixed and confusing. China's financial system is labeled as "inefficient" because of government interventions, such with its credit allocation program and its historically high volume of nonperforming loans (NPLs) (Naughton, 2007, p. 460; Lardy, 1998). Even so, the financial system has supported China's strong economic performance, which, according to mainstream finance and growth theories, should not have occurred. Despite its "inefficient" financial system, dominated by the SOBs, China has also achieved significant financial deepening through its continuing economic reforms. This is the opposite of the highly regarded views that there is a relationship between the size of a financial sector and its efficiency, and that a financial system's efficiency is key to sustaining long-term development. Several researchers are

[1] The big four SOBs in China are the Bank of China, the Industrial and Commercial Bank of China, the China Construction Bank, and the Agriculture Bank of China.

now trying to explain this unexpected phenomenon. For example, Allen, Qian, and Qian (2005) found that the linkages among law, finance, and growth in China are significant but complex. Any confusing results in case studies that include China could be largely due to the "simply applying" approach: the applicability of market-based, mainstream finance–growth theory to China may not be robust enough, and some important features of the Chinese economy and its financial system may not be considered seriously enough.

To understand the confusion caused by China's strong economic performance yet its underdeveloped financial system, it is necessary to study the relationship between China's economic development and economic reforms. In addition, it is necessary to consider alternative theories when analyzing China's economy. This is not only to widen perspectives, but also to overcome the limitations of the mainstream theories, especially as related to transitional economies. For example, in the 1980s, Latin American countries undertook financial sector reforms, which included liberalizing interest rates, removing government credit programs, and opening capital accounts. These reforms did not benefit economic development, and caused several financial and banking crises (Arestis, 2004). This proves that the benefits of financial liberalization policies are not always as robust as what mainstream theorists advocate. The Chinese financial system has undergone successful fundamental market reforms, particularly since the mid-1990s; however, it must be noted that the system is still partly commercialized. It still contains developmental characteristics, for example, social welfare development, infrastructure development, and supporting the rate of labor employment. Thus, mainstream theories cannot appropriately explain or assess the role of finance in China, as they are based on the preconditions of pure market economies. While China now claims it has as a socialist market economy, some features of a

centrally planned economy still exist. Public ownership in various economic entities and government interventions in economic activities continue, though the major reforms have increased market competition throughout the economy.

Considering the limited number of Chinese case studies, it is thus vital to clarify the exact mechanisms through which finance affects the state's economy, and to appropriately characterize the nature of the evolving Chinese financial system. Given the complex nature of the Chinese economy, it is necessary to answer several questions with reference to China's specific economic characteristics and features. These answers are vital for understanding China's financial and economic development.

These questions include: What is the driving force behind China's strong economic performance? And how does this driving force relate to the financial sector? Are reform and development of financial systems the key determinants of economic growth? Are the positive effects on China's development due to its commercial-oriented (and thus profit-seeking) reforms or due to development-oriented reforms? The two primary functions of a financial system are financial resources allocation and credit creation. These can be seen as reflections of, respectively, the commercial and developmental attributes of China's financial sector. Which function, however, is more important for Chinese economic development? Which is better for supporting overall development? Are there any trade-offs between resource allocation and credit creation in China's financial reform? Is it possible that for China these two functions are complementary, not substitutive?

This thesis attempts to answer these questions by drawing on a range of alternative theories to assess the nature of China's financial system and its economic development.

The preliminary proposal is that the financial system contains not only commercial, but also developmental, elements. Fully assessing and studying the development of China's financial system and institutional effects will not only widen the breadth of research for the future, but also contribute to understanding policy implications for future financial reform in China. Moreover, studying China's financial and economic reforms can provide useful references and policy implications for financial reforms in the rest of the developing world.

1.1 Propositions and methodologies: hypotheses and analytical approaches

This thesis is a study of the financial development and its effect on economic development in post-1978 China. Given the continuous dominance of the banking sector in the Chinese financial system, the two objectives assessed in this thesis are: (1) the development of the Chinese banking sector, and (2) its role in economic development. The time span under investigation is 1978 to 2010.

There is conflicting evidence that, on the one hand, China has had significant economic achievement since 1978, and, on the other hand, its financial system is still in an initial stage of development and is "inefficient" when compared with Western economies. The major investigation of this thesis is: How has China's inefficient financial sector successfully supported its economic development? A fundamental step is to define the term "financial development." In a review of the theoretical literature on the finance–growth nexus, the definition has changed over time. In the early literature, "development" of a financial system suggested a degree of monetization in an economy. Against the background of the Washington Consensus and the dominance of

neoliberalism, the definition of financial development became equated with liberalization of financial systems. In the wave of the new growth models in the 1990s, which emphasized endogenous financial intermediations, market failures and market frictions were evident in financial activities. In the 2000s, development thus became related to improved efficiency. In this thesis, financial development in the competing theoretical perspectives will be assessed. Given that development in the financial sector in post-1978 China occurred mainly through financial reforms, this thesis argues that connections exist between the state's on-going financial reforms and economic development. This connection was, and remains, vital for China's economic transformation.

Several theoretical models of finance and development will be tested using the experience of Chinese financial reforms. Whether or not these models hold true, the applicability of such theories can be reflective. This is certainly important, given that China's particular financial system embodies features from centrally planned economic systems, developing economies, and transitional economies. However, in the mainstream literature, the "simply apply" approach adopted in most case studies that include China did not verify the applicability of propositions from the mainstream finance-growth theories. Without such verification, it is not possible to have a comprehensive understanding of the reforms within China's financial sector.

The four propositions of this thesis are:

Market-oriented financial sector reform occurred only over last three decades, and the Chinese financial system currently contains both commercial and developmental characteristics. The first proposition is that a system with mixed characteristics (i.e.,

both market-conforming and market-supplanting attributes) cannot be fully explained by mainstream finance and development theories, as these were developed based on pure market economies, where profit-seeking is set as the only target.

Mainstream doctrines place internal efficiency of financial systems (e.g. allocative efficiency) as central to assessing financial and economic development. A second proposition is that such doctrines cannot substantially explain why China's inefficient financial sector, by neoclassical standards, successfully supports the state's economic development. Alternative theories can offer perspectives that create a better understanding of this growth.

Better economic development can be achieved by improving credit creation (productive efficiency) of the financial sector, according to the theory of endogenous finance from the Keynesian-Schumpeterian tradition. A third proposition is that China's strong economic performance is related to improved productive efficiency of the financial sector.

There is a trade-off between productive efficiency and allocative efficiency. In China's case, the gains in productive efficiency (from financial reforms) outweigh the losses in allocative efficiency; and the gains from an improved productive efficiency aid development. The fourth proposition is that because money creation and credit expansion are specific features of banks, a bank-banked financial system can support development better than other financial institutions.

Both qualitative and quantitative analytical approaches are used in this thesis to research these hypotheses and propositions. The main methodology is a comparative approach,

via qualitative and descriptive analyses at two levels. The first level is to study the developmental process of China's financial sector, both structurally and institutionally, and to compare the effects of financial development during different stages of the state's reform.

The second level is to analyze the effects of financial sector reforms on development in China. This will include verifying the applicability of different finance and development theories and defining the term "financial development" in China. The synthesis of these two levels of analysis will offer a better understanding of China's financial reform.

Developing accurate financial development indictors is crucial in the study of finance and growth. A positive finance–growth nexus, which measures long-term growth rates and aggregate financial indicators, has been accepted in recent China case studies. However, the aggregate indicators may not be sufficient to reflect the dynamics of how finance affects economic growth (that is, the dynamic interactions between aggregated savings, investment, deposits, and loans). In this respect, theoretical models and empirical studies are disconnected from each other because of a conceptual problem: models and studies answer different questions. The majority of empirical studies take the stance that finance leads to economic growth and treat financial indicators as independent variables in their regressions. However, in most of the literature on theoretical models, there is a two-way causal relationship between finance and economic growth. Using larger databases and advanced econometric methods is the usual approach, but what is more important is finding a better measurement of financial development that links both theory and evidence. This is one of the challenges in this empirical study.

This thesis applies traditional measurements on the degree of financial development in China by assessing the effects between savings and investment, deposits, and loans. An analysis of the integration of cross-provincial capital as a broader measurement of China's financial development is undertaken. Furthermore, beyond analyzing the nexus between savings, investment, deposits, and loans, and their dynamic interactions with economic development, this thesis clarifies the possible efficiency attributes (both allocative and productive) in different phases of China's financial reform.

Econometric tests in this thesis are mainly based on the panel technique. This technique is widely used to determine the finance–growth relationship in several studies, and the panel data analysis allows a researcher to study the dynamics of change with a relatively short time series. The combination of time series with cross-sections can enhance the quality and quantity of data in ways that would be impossible using only one of these two dimensions. For example, in this study, the dataset was developed using the year range 1980 to 2010, and included 29 provinces of China. A pure cross-section or pure time series data set can only provide 31 or 29 observers, respectively, while panel data can provide 899 observances (31x29). The main limitation of a cross-sectional approach is that it might not be sufficient to explain the complex relationship between financial development and economic growth via a Barro-style (Barro, 1991) single equation. Therefore, before applying direct econometric tests between financial development indicators and economic growth, panel-based techniques were used on the empirical analysis on the interaction between savings, investment, deposits, and loans.

Data from a variety of statistical yearbooks published by the National Bureau of Statistics of China and government authorities were used as the raw data in this study. In addition, annual reports and published statistical documents from government

departments, publicly published reports, data series, and documents from the central bank and regulation bodies were used. These sources include the Ministry of Finance, the PBOC, the China Banking Regulatory Commission, and the China Securities Regulatory Commission. Datasets, including the World Development Indicators from the World Bank and the International Financial Statistics from the International Monetary Fund (IMF), were used to fill in the gaps in data from China's official sources. Financial development and economic development indicators were developed and calculated according to the raw data to ensure consistency.

Although many researchers have criticized the credibility of Chinese official economic data, current research and studies are now using this official data, and so this thesis also employs official state data for following reasons. First, statistical standards used by the National Bureau of Statistics of China are largely formulated with the guidance of global institutions, including the IMF and World Bank. Therefore, the quality of the Chinese data meets international standards. Second, publishing accurate data is a legal requirement, according to the Statistics Law of 1983. Third, and most important, the Chinese government uses its own official data for internal planning purposes, so that there is no reason to doubt the accuracy of the data (Chow, 2006). It should be noted that while the majority of the official economic data in China is credible, errors may, of course, still exist.

1.2 Structure of the thesis

This study includes nine chapters. This chapter describes the purpose and research background of the study. Along with highlighting the importance and significance of

this topic, this chapter describes the thesis's main methodology and the analytical framework. The major objective of this analysis is to redefine the term "financial development" in regards to China by comparing different finance–growth theories. Through redefining this term, a comparative analytical framework is constructed that focuses on China's financial reforms and its interactive relationship with its economic development.

Chapter 2 offers a detailed review, from both theoretical and empirical perspectives, of the existing literature on the finance–growth nexus. The first section in Chapter 2 looks at the progressive development of research from the financial repression thesis. The second section focuses on the role of finance in contemporary endogenous growth models. In part three, two theoretical frameworks that focus on different aspects, with reference to both mainstream neoclassical and the alternative Keynesian-Schumpeterian theories, are reviewed from a functional view of financial development. Through a comparative review of theoretical models, different feasibility conditions are illustrated. In the final section, empirical applications of the finance–growth nexus, as classified by different econometric approaches, are reviewed. Additionally, alternative approaches that attempt to understand the interaction between financial development and economic development in China are assessed. In this literature survey, along with discussing the advantages and limitations of existing theoretical and empirical models and applications, the connection between theoretical and empirical finance–growth models is reviewed, particularly because these two trends of studies have quite different emphasis.

Chapter 3 offers an explanation of the principle events in China's overall economic transformation and insights into China's financial reform starting in the late 1970s. The banking sector reform is placed in the center of this transformation, given the dominant

role of China's banking industry in all financial activities. By assessing the institutional and structural changes and different focuses throughout the four phases of China's financial sector reforms, this chapter illustrates a clear picture of the particular interactive role financial reform plays in China's economic transformation.

In Chapter 4, by redefining "financial development," an assessment of China's financial development is undertaken. Starting with monetization, the degree of financial deepening and financial broadening of the Chinese economy is explained. China's financial development then is assessed from the perspective of financial liberalization. Along with analyzing the core elements (interest rates ceilings, financial intermediation control, and amount of state intervention in financial activities) according to the financial repression theory, a financial repression index is constructed so as to provide an overall assessment of the degree of financial liberalization in China over the four reforming periods.

Chapter 5 extends the analysis started in Chapter 4, but with a focus on the allocative efficiency of financial development, which defines financial development by the efficiency of the financial sector in allocating resources. First, a comparative analysis is conducted of the two commonly held presumptions in the literature: that China's state-owned enterprises (SOEs) are less efficient than non-SOEs, and that its SOBs are less efficient than non-SOBs. According to these presumptions, SOBs that lend to SOEs are a distortion of allocative efficiency, or, in other words, allocative inefficiency. In a comparative analysis of SOEs and non-SOEs, SOBs and non-SOBs, and several aspects of state and non-state sectors, no evidence was found to support this presumption. Second, two alternative approaches are provided in this chapter to study the efficiency characteristics in resources allocation, from the perspective of investment efficiency and

deviation from market-level investment. Overall, Chapter 4 and Chapter 5 measure China's financial development via different theoretical perspectives. The extent and under what conditions the finance–growth theoretical model is consistent with the evidence is analyzed, which is vital for carrying the analysis to the next level.

Chapters 6 and 7 assess financial development in China by linking allocative and productive efficiency view of financial development with the Keynesian–Schumpeterian model of endogenous credit creation. The focus in both these chapters is the interactive relationship between savings, investment, deposits, and loans. Chapter 6 presents a detailed analysis of aggregate investment, savings, loans, and deposits, so to provide a solid background for the analysis discussed in Chapter 7. In Chapter 7, both theoretical traditions are reviewed in order to understand the evolving interaction between both efficiency models at different stages of China's financial reform. The causal relationship between savings and investment is reviewed through panel error correction models to discover the potential causation between aggregate savings and investment in China and to verify the applicability and validity of both theoretical perspectives in analyzing financial development and real sector development in China

In Chapter 8, further empirical tests on the finance–growth nexus in China are carried out. First, the connection between investment efficiency, the scale of investment, and financial development is captured. Second, the direct interaction between financial development and economic growth in China, using a system GMM panel estimator, is undertaken. In addition, the effect of financial liberalization on China's economic growth is assessed.

Chapter 9 summarizes the main findings of this study, and discusses the limitations and

prospects for future research.

Chapter 2

Literature Review

2.1 Introduction

Following Smith (1776/1904), who first highlighted the importance of finance in economic development in his magnum opus *Inquiry into the Nature and Causes of the Wealth of Nations*, the relationship between the development of financial systems and economic development has received significant attention.

This chapter surveys existing theoretical models, perspectives, and empirical studies on finance and development. By conducting this review, this chapter presents the oft-changing focus and scope of the finance–growth nexus. This, in turn, provides considerable information for developing the analytical framework in this thesis. Section 2.2 explains the original theory of financial repression. Section 2.3 focuses on the endogenous role of finance in new growth theories by emphasizing the existence of market frictions in financial transactions. Functional views of finance, as well as a brief discussion of the complementary relationship between allocative efficiency and productive efficiency of financial systems, are presented in Section 2.4. Section 2.5 discusses empirical studies according to different econometric methods. In addition to reviewing the studies that follow the mainstream approach, studies that draw on alternative theories to assess financial development in China are also discussed. The conclusions of this chapter appear in Section 2.6.

2.2 From the perspective of financial liberalization

2.2.1 McKinnon's and Shaw's financial repression models

The original financial liberalization thesis originated with McKinnon's (1973) and Shaw's (1973) financial repression models, in which they each advocated for examining the institutional effects of financial development. In contrast to earlier monetary growth models, McKinnon and Shaw each highlighted the role of investment and financial intermediation in economic growth, and each developed their models with the assumption that a liberalized financial sector can accelerate economic development. Based on the observation that in developing countries poor performance of investment and economic development is associated, McKinnon (1973) pointed out that this phenomenon occurs because of an inefficiency in a financial system caused by "financial repression." According to McKinnon, typical financial repression policies include interest rate ceilings, high reserve requirements, directed credit allocation mechanisms, and other market distortion policies. These policies then lead to insufficient investment in the economy and undermine long-term economic development. The theoretical framework (and related policy implications) of a financial system free from any intervention, which is based on McKinnon's and Shaw's financial repression models, is known as the financial liberalization theory.

Building on the work of Gurley and Shaw (1955) and Patrick (1966), financial liberalization theory follows the hypothesis of "supply-leading" relationships between financial systems and economic growth. Within the basic assumptions of this framework, investment is a negative function of the real interest rate, but savings are positively correlated with both interest rates and levels of investment. Therefore, in a

typical financial repression policy, such as a nominal interest rate ceiling, real interest rates are kept lower than market-clearing rates. According to Fry (1995, p. 25), growth could suffer from three kinds of detriments. First, a fixed low interest rate could lead low-return investment projects to become profitable, which would decrease the average efficiency of an investment. Second, the rationing of high-return projects could result in a situation of adverse selection. Third, because financial intermediaries cannot set higher loan rates for those accepting risky (that is, more productive) investment projects, credit would be allocated only after considering the risk levels and transaction costs, not the expected return. In an extreme case, if a ceiling is also applied to deposit rates, the savings rate would expect to be reduced as well, as people tend to consume more "today" rather than save for the future. Under the financial repression framework, not only is the efficiency of how savings transfer into investment affected, but so is the equilibrium level of savings and investment. This implies that both quantitative and qualitative channels of investment will be restricted. The policy implications of the financial liberalization theory, based on this example, can be summarized as abolishing interest rate ceilings, reducing reserve requirements, and restricting lending interventions from the state and directed credits. It is expected that financial liberalization would lead to a high degree of financial deepening and thus greater economic growth.

Although McKinnon's and Shaw's models share some common features and lead to similar conclusions and policy implications, there are also some differences. For example, McKinnon used outside money (i.e., money held represents no corresponding liabilities), while Shaw emphasized inside money. In McKinnon's model, money and physical capital are complementary rather than substitutive (1973, p. 59), which highlights the requirement of preexisting savings. In his model, investment cannot materialize without sufficient savings in the form of bank deposits. In McKinnon's

complementarity hypothesis, it is assumed that economic entities are restricted to self-finance, implying that firms cannot borrow to invest and that individuals are involved in investment activities. Thus, the difference between individual consumers and business investors is relatively small. Shaw's model followed establishing debt intermediation, in which firms are not restricted to self-finance and financial intermediation facilitates investment projects by providing loans (Gurley and Shaw, 1955). According to Fry (1995, p. 28), it also implies that the efficiency of financial intermediaries, in allocating financial resources to both savers and investors, is positively related to the growth of per capita income (see also Goldsmith, 1969). Although the original models by McKinnon and Shaw emphasized different roles of internal and external finance in economic activities, from the perspective of the function of investment, these two models are complementary to one other.

2.2.2 Criticisms and complements of the financial liberalization theory

In contrast to the financial liberalization theory, in which higher real interest rates may enhance greater economic development, neostructuralist scholars (for example, Buffie, 1984; Taylor, 1983; Van Wijnbergen, 1983) argue that because of hedge effects and unorganized money markets in developing countries, higher interest rates can negatively affect economic performance. If cost-push inflation increases the rates of deposit, then a substitution of hedge assets (such as gold and land) for bank deposits would result in falling general prices and constricting investment; hence, reducing economic growth. In the neostructuralist models, developing countries' unorganized money markets, or curb markets, are assumed to be more efficient than formal financial intermediaries because there is no need for reserve requirements. Thus, increasing deposits' rates of interest can lead to an increase in the demand for money that comes

from using curb market loans (Taylor, 1983). A reduction in the volume of loanable funds, however, is contrary to the intention of increasing investment levels in financial liberalization. In addition, real interest rates may not be the only intermediation that adjusts levels of savings and investment. As suggested by Demetriades and Luintel (1996), the financial liberalization theory, to certain extent, largely ignores the direct impact on financial deepening by other channels of financial repression, other than interest rates.

Along with the argument of market failure, which is caused by adverse selection and moral hazard (Stiglitz & Weiss, 1981), Demetriades and Luintel (1996) argued that the assumption of perfect competition among financial intermediaries in the financial liberalization theory could also lead to level of bias. Perfectly competitive financial intermediaries imply a zero cost in financial activities, but as a result, not only interest rates but also transaction costs influence aggregate savings and investment. Laurenceson and Chai (2003) argued that little effort has been made to study the behavior of financial institutions in the financial liberalization theory.

Interpreting the relationship between savings and investment, Arestis (2005) and Arestis, Nissanke and Stein (2005) argued that the role of savings is overstressed in the financial liberalization theory. In McKinnon's model, preexisting savings fund investment, leading to capital accumulation. However, capital accumulation is not directly facilitated by savings but by investment loans provided by the financial system. The process of financing investment is the result of credit creation by the financial system, which means that savings is not a prerequisite for investment. In other words, it is the financing mechanisms, not savings, which affect economic growth. Despite over-stressing the role of savings in growth determination, for causality issues, as suggested by the post-Keynesian school, it is loans, not savings, which create deposits.

Hellman, Murdock, and Stiglitz (1997) argued that, from the perspective of financial restraint, some government interventions may generate positive effects on economic development, but not on the adoption of financial liberalization policies. Because the financial liberalization theory focuses on less developed countries (LDCs), Yang (1996) extended the theory to include reforming centrally planned economies (CPEs). He argued that while reforming CPEs and LDCs share some similar features, in reforming CPEs financial controls are more important than finding a conventional market solution, in which interest rates are not an effective tool to adjust aggregate savings and investment.

In a follow-up to his original theory, McKinnon (1993) stressed two prerequisites for the practice of financial liberalization theory: the role of sequencing and institutional preconditions. Based on the empirical evidence of financial crises in developing countries over the last 30 years, countries that choose different sequencings experienced similar financial crises as those that followed the optimal sequencing advocated by McKinnon (Arestis, 2004; Arestis & Stein, 2005). However, Arestis and Stein (2005) pointed out that the instability of such macroeconomic environments, resulting from the failure of financial liberalization policies, is not due to wrong sequencing but to theoretical weakness in the theory. They further suggested that it is necessary to analyze "institutional endowments" in order to achieve a better understanding of the development of a financial system.

2.3 The role of finance in endogenous growth models

2.3.1 From exogenous growth theory to endogenous growth models

In McKinnon's and Shaw's theories, financial liberalization has only short-term effects. Whether financial development can affect long-term economic growth and what is the long-term relationship between finance and sustainable economic growth are core questions to answer. The emergence and development of the endogenous growth theory (new growth theory) in the early 1990s made it possible for financial development to be treated as an endogenous process and a determinant of economic growth. That is to say, in endogenous growth models, the marginal product of capital is assumed not to decrease because of diminishing returns to scale. Therefore, the determinant of economic growth becomes a "positive function of the investment ratio" (Fry, 1995, p. 69). In McKinnon's and Shaw's financial liberalization framework, the basic link between finance and real sector output growth is the complementarity between money and physical capital, while in the endogenous growth models, the theoretical basis is how financial systems correct market failures caused by informational asymmetry and transaction costs. Under the endogenous growth theory, a causal relationship between finance and growth is two-way: financial sector development can promote the efficiency of resource allocation (economic development), and economic development can promote participation in the financial sector (Arestis, 2005). As increased efficiency of firms that result from constant return to scales (CRS) or increasing returns to scale (IRS) is made a function as aggregate capital stock, and capital accumulation increases efficiency throughout the entire economy. Pagano (1993) argued that a financial sector development can experience overall growth effects, not just level effects.

In a typical exogenous growth model, for example, the Solow (1956) model, it is assumed that a steady long-term growth rate is determined by exogenous variables (e.g., technological changes, human capital formulations). The key feature of exogenous growth models is the decreasing returns to capital (DRK), which means that economic behavior and economic policies have only level effects. Financial development also has only level effects, not growth effects, because finance is assumed to affect the quantity and quality of investment and output levels, but not the rate of growth directly.

The development of endogenous growth models relaxed the assumption of DRK and introduced the concept of CRS and IRS. This means that the long-term equilibrium growth rate could be affected by other factors, such as human capital. There are two waves of endogenous growth models, and according to Fry (1995), the first wave models by Romer (1986) and Lucas (1988) modeled financial intermediation: "The precise cause of endogenous growth does not affect the role of finance" (Fry, 1995, p. 61).

2.3.2 Endogenous financial intermediation in endogenous growth models

In De La Fuente and Marin (1996), second-wave endogenous growth models can be seen as a synthesis of first-wave endogenous growth models and endogenous financial intermediation (the endogeneity of both economic growth and financial development) (see Diamond, 1984; Diamond & Dybvig, 1983). In second-wave endogenous growth models, the role finance plays in economic growth is explained under the framework of financial functions because of market frictions and imperfect markets. It is assumed that in developing a financial system, problems such as informational asymmetry and uncertainty would be lessened, and the efficiency of resources allocation would be

improved, directly effecting long-term growth. Fry (1995), however, proposed that second-wave endogenous growth models ignored the dynamic process of financial liberalization and stabilization, so that short-term stabilization and long-term economic growth were not considered simultaneously.

There are two groups of literature on second-wave endogenous growth models. The first group, based on the overlapping-generations model developed by Diamond and Dybvig (1983), emphasizes the importance of liquidity provisions in financial systems (Bencivenga & Smith, 1991, 1992; Greenwood & Smith, 1997; Levine, 1993; Saint-Paul, 1992). The second group is based mainly on Diamond's (1984) model, which stressed that the strength of a financial system is in collecting, processing, and producing specialized information. By acquiring information, financial systems allow facilitation of real sector growth through better resources allocation (Greenwood & Jovanovic, 1990; King & Levine, 1993b). Most of the literature in both groups advocates a two-way relationship between financial development and economic growth: real sector development increases incentives to form a more sophisticated financial system, and a sophisticated financial system promotes more efficient real sector growth. Also, a fixed entry fee in running financial intermediation is always assumed to be exist, which implies the need for a more sophisticated financial system (Bencivenga & Smith, 1993; Greenwood & Jovanovic, 1990; Greenwood & Smith, 1997; Levine, 1993).

In first group, Bencivenga and Smith (1991) introduced a three-period-lived overlapping-generations model to investigate the liquidity risks of banks. It first assumed that liquid investment is not directly productive. With risk diversification provided by financial systems, financial resources can be invested into riskier but more productive projects. In other words, the emergence of financial intermediation is to meet

the liquidity requirements of individual investors, so as to adjust pooled resources into such projects. In general equilibrium, higher growth rates can be achieved because financial systems facilitate investment favorable to capital accumulation. To extend this model, Bencivenga and Smith (1992) included government and economic policies. Because the formal financial sector (e.g., banks) is more advanced at pooling and sharing risks — via financial liberalization-oriented economic policies — the informal financial sector (e.g., curb markets) tend to transfer financial resources into the formal sectors. This is in contrast to critical arguments within the neostructuralist school (see Buffie, 1984; Taylor, 1980; Van Wijnbergen, 1983, 1985).

Financial intermediaries, performing not only as banks but also as stock markets, promote economic growth (Greenwood & Smith, 1997; Levine, 1993; Saint-Paul, 1992). Along with banking systems, stock markets also provide risk aversion mechanisms by allowing individual investors to sell their stocks during an investment project. Therefore, both investing in financially productive but risky projects and individuals' ability to liquidate are possible. As for the structure of financial systems, Greenwood and Smith (1997) argued that competition among market service providers allows for a more efficient market. They also pointed out that only financial intermediation, not equity markets, can stimulate economic growth.

As summarized by Fry (1995, p. 67–68), the endogenous models based on Diamond and Dybvig (1983) assume a financial system is risk averse, as the aim is greater investment and higher growth rates. For example, banks and mutual funds use portfolio diversification to reduce risks, while stock markets satisfy both fund demands from firms and liquidity needs for individual investors.

Greenwood and Jovanovic (1990) developed a different model in the second literature group. Their model introduced the dynamic interaction between finance and growth through a financial system's function of acquiring high-quality information. In their model, financial intermediaries produce better information, which leads to better resource allocation. For example, if there is a fixed cost for forming or joining a group of financial intermediaries, through economic development, more individuals could afford that price, increasing the number of financial intermediaries that produce higher quality information, leading to even higher allocative efficiency. Through this dynamic cycle, financial development stimulates economic growth, and vice versa.

Also from the second literature, King and Levine (1993b) and Saint-Paul (1992) indicated the role of financial intermediations in evaluating firms' ability for technological innovation. In their models, both financial intermediaries and financial markets can improve processing-information efficiency, which can help determine which projects have the best possibility of success. With more reliable information, financial intermediation can allocate resources for these projects, and new innovations can accelerate productivity and economic growth. Based on the assumption that specialized technologies are riskier than more flexible ones, it is argued that with better information, financial markets can encourage greater specialization of labor and increased capital into production by introducing a diversified portfolio (Saint-Paul, 1992).

The model by De La Fuente and Martin (1996) assumed that successful technological innovation depends on the monitoring of firms' actions by outsiders, for example, by financial intermediaries. If innovation can only be monitored at a cost, the optimal level of monitoring can then be determined by relative factor prices. By adjusting monitoring

activities to the optimal degree, financial systems can balance the cost and benefit of innovative activities. This suggests a positive relationship between the development of financial systems and innovation activities, and hence economic growth. Diamond (1984) and Sussman (1993) pointed out that the formation of financial intermediaries could be the result of incentives offered by monitoring firms. The cost of financial intermediation decreases as the number of financial intermediaries and market competition increases. Conversely, Saint-Paul's (1992) model assumed that the cost of financial intermediation is exogenous and adjusted by government taxation, which implies the role of government in promoting the efficiency of a financial system.

This point of view was extended by Roubini and Sala-i-Martin (1992, 1995), who introduced government interventions as a kind of financial repression in their endogenous growth models; they argued that both monetary and fiscal policies can produce taxations of financial intermediaries. They indicated that a government that does not consider long-term effects will choose to repress its financial sector because it is assumed that a financial system will provide cheap and easy resources for the public budget. Such governments opt for economic policies to increase per capital real money demand, which increases inflation revenue. The repression will produce a negative effect on the number of quantitative and qualitative financial services, and reduce the efficiency of resources allocation. The influence of financial repression is obvious, and in Roubini and Sala-i-Martin's model, high inflation, tax evasion, and lower economic growth are linked.

Pagano's (1993) review of the finance–growth nexus provided a broader scope to look inside the role of finance in economic growth. Based on an AK style production function:

$$Y_t = AK_t \quad (1)\ (\text{Eq. } 2.1)$$

where Y_t is total output at time t; K_t is capital stock at time t (which include both physical capital and human capital); and A reflects the social marginal productivity of capital (i.e., the level of technology). The function (1) shows that the aggregate output is a linear function of the aggregate capital stock.

Pagano (1993) assumed that if a population is fixed and there is only one good in the market that can be either consumed or invested, then the total investment in time t can be shown as the total capital at $t+1$ minus that at time t:

$$I_t = K_{t+1} - (1-\delta)K_t \quad (\text{Eq. } 2.2)$$

Here, δ is the depreciation rate. Assuming that the economy considered is a closed one, and there is no role for government, the total savings, S_t will be equal to total investment, I_t so as to achieve capital market equilibrium. Because of market frictions, such as transaction costs and informational asymmetry, a proportion of savings, at a rate of $1-\emptyset$, will be lost, which can be seen as the inefficiency of financial system:

$$\emptyset S_t = I_t \quad (\text{Eq. } 2.3)$$

The growth rate of total output, g_{t+1} at time $t+1$, will be equal to

$$\frac{Y_{t+1}}{Y_t} - 1 = \frac{K_{t+1}}{K_t} - 1 \quad (\text{Eq. } 2.4)$$

By combining this equation with Equation 2, and by moving the time factors, a stable growth rate will show as

$$g = A\frac{I}{Y} - \delta \quad (\text{Eq. } 2.5)$$

and by defining $s = \frac{S}{Y}$ and the small s means the savings rate, Equation 5 can be rewritten as

$$g = A\emptyset s - \delta \quad (\text{Eq. } 2.6)$$

Equation 6 clearly shows how financial development can affect economic growth.

In this AK model, the steady long-term growth rate can be affected by influencing A, ∅, or s by: (a) increasing A (the improvement in technology); (b) increasing ∅ (enhancing a financial system's efficiency for transferring savings to investment); or (c) increasing s (increasing saving rates directly).

Table 2.1 contains a detailed summary of the key studies on both waves of endogenous finance–growth theories.

Table 2.1 Endogenous finance and growth models

First-generation models	Model	Main findings
Bencivenga & Smith (1991)	Developed three-period-lived overlapping-generations model; assumed only "illiquid" investment yields productive capital.	Financial intermediaries positively affect real growth rate determination by affecting composition of savings in economy favorable to capital accumulation.
Bencivenga & Smith (1992)	Developed three-period-lived overlapping-generations model; assumed role of liquidity provision in determining output and inflation. Created model to formalize optimal degree of financial repression / liberalization.	(1) If curb markets appear due to financial repression, financial liberalization helps transfer funds from informal financial sector to formal one; (2) financial market liberalization delivers efficient risk sharing by increasing inflation tax base.
Bencivenga & Smith (1993)	Developed two-period-lived overlapping-generations model; assumed role of informational frictions in investment projects and role of credit rationing; assumed two-way causal direction between real growth rates and the level of credit rationing.	(1) Level of credit rationing negatively associated with real growth rates; (2) government policies designed to affect extent of credit rationing affects growth on output determination.
Greenwood & Jovanovic (1990)	Developed general equilibrium model with endogenous financial intermediation sector; assumed bi-directional relationship between financial intermediaries and economic growth if functions of collecting and analyzing information are highlighted.	(1) Financial intermediaries allocate funds to investment projects with highest returns, and economic growth leads to financial development; (2) economy obtains higher growth rates in its infancy and achieves stable income distribution with developed financial structure.
Greenwood & Smith (1997)	Developed two models; assumed endogeneity of market formation.	(1) Financial markets follow certain levels of real development (given cost of market formation); (2) formation of financial markets promotes economic growth through liquidity provisions and by overcoming transaction costs; (3) competition among potential players in the market causes efficient formation of the market.

De Gregorio (1993)	Developed three-period-lived overlapping-generations model; highlighted role of borrowing constraints in savings determination; individual behavior based on life-cycle hypotheses.	(1) Borrowing constraints lead to higher rates of savings and increases physical capital accumulation; (2) borrowing constraints negatively affect human capital accumulation (individuals usually maximize income when facing borrowing constraints); (3) overall effect of borrowing constraints on growth uncertain.
King & Levine (1993b)	Developed endogenous growth model; emphasized role of financial systems in entrepreneurial selection. Based on the Schumpeterian tradition.	(1) Financial systems assess prospective entrepreneurs and select projects with highest degree of successful innovation; (2) resources mobilized to finance promising projects though financial intermediaries; (3) financial systems allow investors to diversify risks, given uncertainty of innovative activities; (4) revealing potential profits, financial systems stimulate innovations.
Levine (1993)	Developed endogenous growth model; emphasized easing liquidity and productivity risks, and costs of transactions, information gathering, and resource coordination.	(1) At the level of development, policies and legal codes determine financial structures and financial services; (2) risk diversification, information processing, and cost easing allows financial systems to determine levels of investment (and hence rate of economic growth).
Roubini & Sala-i-Martin (1992)	Developed endogenous growth model with the role of financial development and inflationary finance.	(1) Governments favor financial repression policies (leads to larger stocks of nominal money in private sector; hence increases in inflationary revenue (tax) for governments); (2) side effect is reduction in total amount of financial services provided by financial systems (reduced inputs and outputs lowers rate of economic growth).
Roubini & Sala-i-Martin (1995)	Developed endogenous growth model with financial repression, tax evasion, and inflation.	(1) Governments advocate financial repression, if tax evasion is serious, to increase revenue from money creation; (2) financial repression decreases efficiency of financial sector, increases costs of intermediation (which decreases investment levels and rates of economic growth); (4) financial repression leads to tax evasion, low growth, high inflation.
Saint-Paul (1992)	Developed endogenous model; assumed role of technological choice of financial markets.	(1) Diversified investment portfolios allow agents in financial markets to hedge investment projects (leads to specialized divisions of c and productivity; (2) financial markets allow for riskier technologies (technological choices affect viability of financial markets); (3) lowering financial market operating costs allow governments to promote financial development through policies.
Sussman (1993)	Developed one-period endogenous growth model with a banking institution component.	(1) Incentives to monitor firms causes formation of banks; (2) markets for financial systems grow through capital stocks accumulation (leads to increase in number of banks; (3) individual banks become specialized and efficient with expansion of banks; (4) competition among banks leads to decreases in costs of financial intermediation and markups of financial services.
De La Fuente & Martin (1996)	Developed endogenous growth model; assumed the role of innovation in growth determination.	(1) Financial development and output growth endogenously determined; (2) efficient monitoring on innovative activities delivered when financial intermediaries occur endogenously; (3) optimal degree of monitoring determined by price of financial intermediations (affected by accumulation of capital); (4) better monitoring by financial intermediaries promotes level of innovative activities (through better insurance terms).

2.4 Functional views of financial system

To understand the mechanism how finance affects economic development, the functions of a financial system — the role it plays in the economy and what channels it facilitates in real sector economic development — is assessed in this section.

In order to provide a broad theoretical basis, both neoclassical and Keynesian–Schumpeterian frameworks (which concentrate on different functions of financial systems) are reviewed. The neoclassical framework of the finance–growth nexus mostly focuses on how financial systems enhance the efficiency of resource allocation through so-called market frictions, which include information costs and transaction costs. Starting with Arrow (1964) and Debreu (1959), under the neoclassical framework, financial systems are said to ameliorate informational asymmetry (Diamond 1984) and transaction costs because of market frictions in economic and financial activities. Therefore, through accommodations of the financial system, such as mobilizing savings, producing useful market information, and monitoring corporate governance, enterprises can achieve effective production and efficient investment through better resources allocation. The development of a financial system that focuses on functions that aim for efficient resource allocation is induced as the allocative efficiency of a financial system. In contrast, credit creation, which is another important function of a financial system according to the Keynesian–Schumpeterian framework, is understood as a productive efficiency of financial development.

On the concept of money, the Keynesian–Schumpeterian framework assumes that money and credit—or in a broader concept, finance—is endogenous to economic

development, and that the main function of a financial system is to create money and credit in the market (Davidson, 2002; Lavoie, 1984, 2006; Palley, 1996). Financial systems create credit to meet firms' investment needs, and loans are created out of nothing, not from preexisting savings, which is what is expected in the mainstream framework. In turn, investment facilitated by a financial system will deliver savings accumulation for both firms and households. Under the Keynesian–Schumpeterian framework, the linkage goes from investment to savings, but that is reversed in standard theories. Under the Keynesian–Schumpeterian framework, the development of a financial system is treated the same as how credit is developed efficiently, which is the productive efficiency of a financial system.

Two core functions of a financial system can be distinguished: the allocative efficiency, and the productive efficiency. It is fair to argue that these two frameworks are not in conflict because they focus on different roles in financial systems. Allocative efficiency focuses on the quality of finance (a qualitative view), while productive efficiency focuses on the quantity of finance (a quantitative view). The next three sections discuss how these efficiencies are achieved. The first section focuses on allocative efficiency; the second section, productive efficiency; and the third section, the interactive relationship between these two efficiencies.

2.4.1 Allocative efficiency, a qualitative view

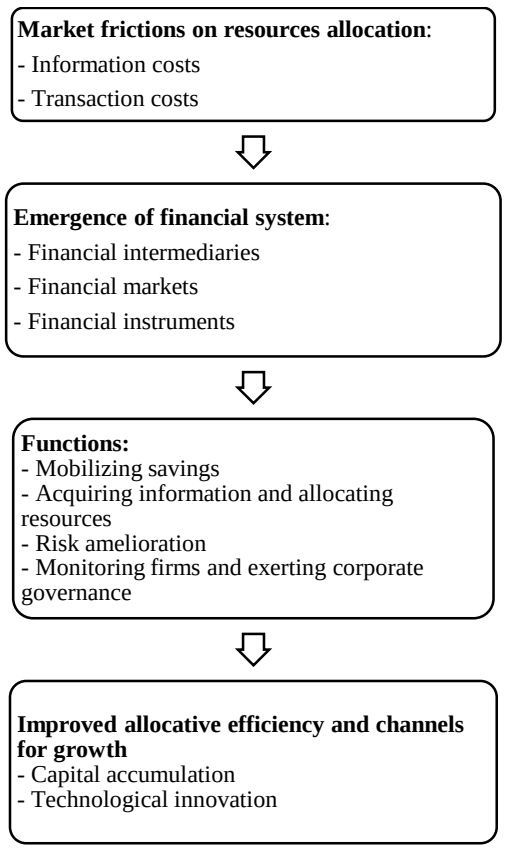
Starting with the pioneering works of Schumpeter (1934) and Gurley and Shaw (1955), it has been argued that economies grow faster under developed financial systems. Following the standard neoclassical growth theories, which is based on Solow's (1956) model, it is assumed that there are two basic channels that link financial system

development with real sector growth, both quantitatively and qualitatively: capital accumulation and total factor productivity (explained as Solow residuals). The quantitative channel of capital accumulation mainly focuses on the pooling and mobilization of savings by individuals. Through savings mobilization, financial systems provide funds and facilitate productive investment projects for enterprises, and hence promote output growth and capital accumulation. An efficient financial system also channels funds into projects that use new technologies, increasing the possibility of innovation and higher productive output growth. The qualitative channel shows that financial system development raises the efficiency of financial resources allocation, but reduces levels of informational asymmetries because of market imperfections (Greenwood & Jovanovic, 1990). To improve the quality of financial services, financial systems must develop new financial technologies.

Many scholars started their analyses from an institutional perspective of financial systems. Merton and Bodie (1995) offered that the functions and services of a financial system are more stable than the financial structures, as systems do not change much over time. They also said that the structure of institutions follows the development of functions, not vice versa. A functional approach may provide a better understanding of the role a financial system plays in economic development. According to Levine (1997, 2005), Merton (1992), and Merton and Bodie (1995, 2005), the functions and services provided by a financial system that are designed to deliver better economic performance can classified into several categories. Furthermore, the channel through which basic functions affect growth is efficient resources allocation; these basic functions serve as part of the aggregated level, single primary function, i.e. the function of allocative efficiency. This follows the functional approach first introduced by Levine (1997). In this approach, basic functions and services are summarized into four categories:

mobilizing and pooling savings, acquiring information and allocating resources, managing risks, and monitoring and exerting corporate governance (see Figure 2.1).

Figure 2.1 Mainstream functional view of financial development



Source: Levine (1997, p. 691).

2.4.1.1 Mobilizing and pooling savings

In assuming that a financial system is to achieve efficient resources allocation, then financial resources are understood as savings, both household and corporate. Arestis and Demetriades (1993) found that, according to the financial repression models developed by McKinnon (1973) and Shaw (1973), savings are assumed to be financial savings, which is a mix of unproductive assets and interest-seeking deposits. This is in contrast to the assumption of total savings in Solow's (1956) growth theory. Solow's theory is

based on the logic that financial savings affect the supply of loanable funds in the marketplace, and hence the level of economic development created by investment.

It is assumed that a well-functioning financial system can enhance the efficiency of savings mobilization. In Levine (2005), the mobilization procedure is costly because savers hand over control of their money to institutions, yet it also creates a higher efficiency because it eases the frictions of both transaction costs within the process of collecting savings from individuals and the informational asymmetry costs between savers and potential users of the savings. Through savings mobilization, individual financial resources are integrated into group investment. With sufficient external financial resources, the limitations of project investment through self-finance are overcome; and this directly affects capital accumulation and economic growth. The mobilization of savings is through financial instruments, for example, diversified portfolios or financial markets (i.e., security markets). With the introduction of these instruments, improvements in risk diversification and liquidity are achieved. Pooling savings also has an effect on how quickly firms can grow and expand. By introducing multiple investors into a project, economically inefficient scaling during production processes can largely be reduced (Acemoglu & Zilibotti, 1997; Sirri & Tufano, 1995).

Along with increased financial resources through increased savings mobilization, sufficient funding from the financial system also impacts economies of scale by overcoming liquidity constraints and by offering potential technological innovation (Bagehot, 1873/1962; McKinnon, 1973; Shaw, 1973). Increased funding, of course, indirectly promotes economic growth, as well.

2.4.1.2 Acquiring information and allocating resources

In Merton and Bodie (1995), producing useful information for decision-making processes is treated as a latent function of financial systems. The helps determine, for example, the costs of evaluating firms and market conditions before investment. For the individual investor, two constraints must be faced: lack of capabilities and means to acquire, process, and produce information effectively; and investment decisions are determined by the quantity and quality of their information. If there are fixed costs in acquiring information about investment projects, without a financial system — which here mainly implies financial intermediaries — individual investors will have to pay for those fixed costs. This situation explains why in an emerging financial systems, individuals are incentivized to form financial intermediaries, so as to economize on the costs of acquiring information (Diamond, 1984).

Starting with Schumpeter (1934)，information processing through financial systems not only includes identifying firms with better production, but also firms with a higher possibility of developing new technologies and innovation (Acemoglu, Aghion, & Zilibotti, 2006; Blackburn & Hung, 1998; Galetovic, 1996; King & Levine, 1993b; Morales, 2003). In other words, financial systems can affect economic growth by stimulating technical innovation through collecting, processing, and producing information.

2.4.1.3 Managing risks

Reducing risks through trading and pooling resources is generally believed to be another important role of financial systems. Levine (2005) concluded that to overcome

both informational and transaction costs, emerging financial intermediaries and financial markets need to include the vehicle of diversification and pooling of risks.

Two distinct types of risks are considered here: liquidity risks and investment failure. Liquidity risks reflect the uncertainties of trading assets into a medium of exchange. Within financial systems, uncertainties can be diversified and transferred through financial instruments, such as bonds, equities, and demand deposits. As to the process, consider the following situation, with the assumptions that investors are not willing to lose long-term control of their savings and that high-return projects are positively related to long-term capital flow and investment. In Diamond and Dybvig (1983), there are two additional assumptions: it is difficult for individual investors to identify whether another individual has received a shock, and that those who receive a shock want to access their money before the project produces returns. Under such situations, if there is no role of state-contingent insurance, there is the incentive to form financial markets to alleviate frictions. Furthermore, financial intermediaries, especially banks, can offer liquid insured deposits to individual investors so as balance both liquidity and returns on projects.

Other risks are the possibility of investment failure and lack of diversification. Based on the logic that high-return projects are high-risk and that investors are normally risk averse, Gurley and Shaw (1955) stated that by introducing portfolios, financial systems shift funds toward higher return projects. In the portfolio theory, the introduction of a diversified investment portfolio means there is investment in both high-return and innovation-related projects, which usually involve higher risks of failure, and economic growth is enhanced through not only capital accumulation but also technological innovations (Acemoglu & Ziliboti, 1997; King & Levine, 1993b).

2.4.1.4 Monitoring managers and exerting corporate governance

Starting with Coase (1937), corporate governance means that as individual investors become involved in investment projects through financial systems, share or equity holders have an influence on the behavior of firm managers. The goal of these investors is, of course, profit maximization. According to Stiglitz and Weiss (1981), without corporate governance, financial institutions may not collect enough information on borrowers, which could lead to adverse selection and constrain both the efficiency of savings mobilizations and the flow of capital. Monitoring processes offer a higher certainty that firms will be profitable, productive, and more efficient.

Diamond (1984) argued that, with proper financial arrangements, financial intermediaries might not only reduce monitoring costs but also ease the problem of "free riders." Monitoring by financial intermediaries is the same as monitoring by the investors. Stock prices can also act as a tool to evaluate company assets and the performance of firm managers (Diamond & Verrecchia, 1982). This in turn can lead stronger corporate governance.

2.4.1.5 Summary

Following McKinnon's (1973) and Shaw's (1973) financial repression thesis (the importance of a liberalized financial system in supporting long-term economic development in developing economies), the mainstream theory of finance and growth also largely emphasizes the importance of market principles in improving efficiency in allocating financial resources. The basic assumption behind these market principles is

the existence of market frictions; that is, informational asymmetry and transaction costs. A market-oriented financial development path is key to facilitating a financial system and thus economic development. The same is true for new growth theories; that is, endogenous growth models were introduced in the analytical framework because endogeneity of financial intermediation was assumed.

As mentioned above, in financial development, according to Levine (2005), several related basic functions of a financial system can be classified under the aggregated primary function of "allocative efficiency" (Levine, 1997, 2005; Merton, 1992; Merton and Bodie, 1995, 2005). In other words, the major function of a financial system is to match savings and investment in the most efficient way.

2.4.2 Productive efficiency, a quantitative view

In the mainstream finance–growth theory, financial systems try to ease market frictions (informational asymmetry and transaction costs) to create real sector development. Through policy making and developing financial functions, a more sophisticated and larger financial system becomes efficient in easing market frictions. These are but two functions that influence finance, and hence economic development.

In contrast, post-Keynesian economists (e.g., Davidson, 2002) argue that the above analysis ignores vitally important functions of a financial system, especially a system with both a central bank and commercial banks. These are the functions of credit, and more basic, the function of money creation, which is where the supply of credit is treated as endogenous (Palley, 2002).

This theoretical tradition, with the view of endogenous money, can be traced to Schumpeter and Keynes. It was Schumpeter (1934) who first presented the idea that creating money is a function only of banks. Through credit creation, banks facilitate productive firms to adopt new factor combinations (i.e., new technologies). Keynes (1937) highlighted the role of money in finance when he introduced the so-called finance motive as one of the four reasons to demand money.

Post-Keynesian scholars extended the endogeneity view of money into a broader framework, known as endogenous finance, and put this type of finance as central in post-Keynesian monetary theories (Palley, 1996, 2002; Banchs, 2006). From Lavoie (2006), the logic behind endogenous finance is based on two assumptions: that there will always be a "fringe of unsatisfied customers" (implying credit rationing) (see Keynes, 1930, p. 364) and that financial intermediaries always meet firms' demands (implying that the causal direction of a savings–investment nexus is from investment to savings). Under this logic, the original source of funding in a business cycle is the will of investment from firms.

In Davidson (2002), the endogenous supply of credits is understood as an "income-generating-finance" process. It is assumed that firms have a profit incentive: controlling working capital loans through increased borrowing in order to overcome the higher costs of increased flow of output. On the assumption that a financial system can accommodate a demand of loans from firms, the system would respond positively to firms' request, and the attendant expansion of credits would be seen as an endogenous process. In the short-term, increasing real income and prices follow the endogenous expansion of credit supply. The expansion of credits will stop when a new and higher equilibrium output level is achieved. Conversely, when firms expect that credit demand

will decline, the process reverses, so that the supply of credits declines endogenously, though debt pay-off.

Through credit creation, Nell (1992) stated that the level of effective aggregate demand could be stimulated to enhance economic growth. Palley's (1994) credit-driven model of a business cycle showed a similar approach: the total amount of credit throughout an economy expands. The function of a financial system, under the mainstream framework, is to ease market frictions of both transactional and informational asymmetry costs so as to improve the efficiency of financial resources allocation. It is fair to say, then, that the function of credit creation is to increase the number of financial resources in the economy. Efficient credit production through endogenous mechanisms begins with investment by firms.

In other words, contrary to the view in the mainstream framework that savings occur when sectors individually decide to save, in the endogenous finance theory from the Keynesian-Schumpeterian tradition, savings occur when there is income creation from investment (Dullien, 2009). Investment is created by entrepreneurs' willingness to invest and through facilitation by bank credits. In this alternative framework, the objective is the interaction of finance and the real economy, not the financial system itself. The main function of a financial system in economic development is to create money and credit in the market, not overcome market frictions.

When applied into practice, this quantitative view explains the strong economic growth performance in certain developing countries that not only had inefficient financial systems, but also had no ex-ante increased saving rates or international capital inflows during their economic take-off (Dullien, 2009). When assessed under a productive efficiency view of finance, a key function of financial development is creating credit

"out of nothing" (Herr, 2010).

The instability of finance, first raised in Minsky's famous finance instability hypothesis, is largely overlooked in the neoclassical world. While Minsky's hypothesis focuses on short-term instability (Palley, 2011) and the Keynesian–Schumpeterian theory of endogenous finance concentrates on long-term economic development, what both theories have in common is that they treat finance as a dynamic integration between money credit and productive investment. This too is overlooked in the mainstream doctrine. The allocative efficiency view of financial development focuses more on improvement in a financial system itself; that is, the achievement of several financial functions rather than the dynamic interaction between financial development and the real economy. The Keynesian–Schumpeterian theory treats finance and financial processes as dynamic, while the mainstream doctrine sees financial development as static and isolated.

2.4.3 Discussion

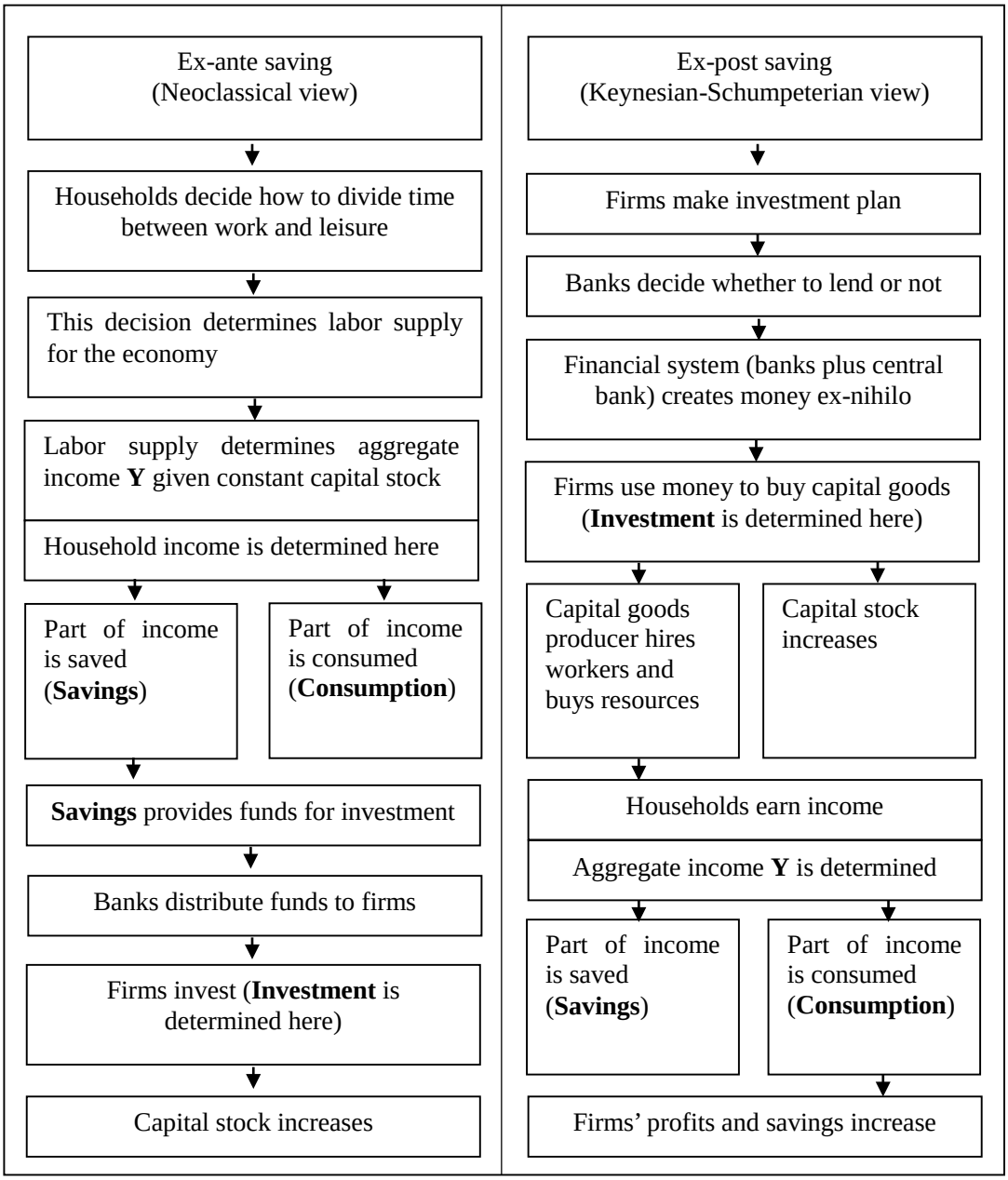
2.4.3.1 Differences between the two frameworks

To discuss the differences between these two frameworks, or the two distinct functions of a financial system, it is important to review the sources of investment funds. The neoclassical framework assumes that, before any investment activities, there are preexisting financial resources, namely, financial savings, in the economy. Thus, a financial system acts as a financial intermediary to facilitate a firm's investment through these resources. In Palley (1994), this precondition implies that savings are transferred

into loanable funds that are automatically invested. With the introduction of market frictions, which occur between savings and investment integration, the finance mechanism maintains the same. In an Arrow (1964) and Debreu (1959) world, perfect markets and information means there is no need for a financial system to improve its efficiency in resources allocation, and money is assumed to be exogenous because the money supply is adjusted by central banks through tools like open market operations. According to Hahn (1981), there is no room for the existence of money in these models. Based on the assumptions that financial resources are determined by exogenous nature endowments and that the money supply is exogenous, the functions of a financial system are restricted to helping ease inefficiencies in financial resource allocation, not to creating more resources.

The Keynesian–Schumpeterian framework emphasizes the endogeneity of the credit supply. Financial systems can create credit out of nothing to meet the willing investment from firms because of the existence of a money-multiplier. Economic development under this framework can be seen as a development path via credit expansion, leading to capital accumulation and technological innovations. How a financial system creates credits sufficiently to meet the demands of firms and stimulate both the output level and economic growth are functions for productive efficiency. Figure 2.2 shows the dynamic business cycle based on the logic of these two frameworks. As mentioned above, the neoclassical framework concentrates on the quality of funds, while the Keynesian–Schumpeterian framework focuses on the quantity of credit.

Figure 2.2 Contrasting views on the savings–investment nexus



Source: Dullien (2009, p. 8).

2.4.3.2 Complementation or substitution

Two efficiencies are discussed in this section: allocative and productive. Since they focus on different things, it is fair to say that the relationship between them is complementary, not substitutive. Investigating the development of a financial system can be interpreted as an assessment of the savings–investment nexus. The distinguishing

difference between these two efficiencies is whether savings cause investment or investment causes savings. By carefully evaluating the impact of financial development on savings and on investment, and on their nexus, can provide important information in assessing the mechanisms behind finance and development, and through which financial systems effect real sector development.

Lo, Li, and Jiang (2011) argued that these two theoretical models represent different development strategies, and their development paths focus on different aspects of financial intermediation to facilitate economic development. On the one hand, the mainstream finance–growth view is that, at each given period, financial systems optimize efforts on resources allocation, subject to the constraints of the availability of resources. On the other hand, the Keynesian-Schumpeterian view emphasizes the improvement of the "productivity" of a financial system, which largely means credit creation as the mechanism that supports real sector growth. An "inefficient" financial system, from the mainstream criteria, can be "efficient" from the alternative perspective. Yang (2006) and Lo et al. (2011) argued that the potential trade-off between these two efficiencies is the key to interpreting how an "inefficient" financial system can support real sector growth, for example, as in China. One explanation is that the gains from a productive efficiency in China's financial system have been greater than the costs of allocative inefficiency.

2.5 Empirical evidence

Since the pioneering work of Goldsmith (1969), McKinnon (1973), Shaw (1973) and Gupta (1984), a growing number of empirical studies have focused on the nexus between financial development and economic growth. Although some work applied

time series analyses to find out the potential causality between the finance–growth nexus, most of the existing literature used cross-sectional (cross-country) (see Barro, 1991) and panel analyses. Despite some exceptional studies (see Andersen & Tarp, 2003; De Gregorio & Guidotti, 1995; Khan & Semlali, 2003; Ram 1999; Zhang, K., 2003), a positive relationship between the measures of finance development (e.g., M2/GDP) and economic growth (e.g., the growth rate of real GDP per capita) has been documented in most empirical studies (Demetriades & Andrianova, 2004). This implies that there exists an association between finance and growth, both across and within countries over time. Aghion, Howitt, and Mayer-Foulkes (2005, p. 214) argued that above a certain critical level of financial development, a positive, though "eventually vanishing," effect of finance on long-term economic growth rates can be found. Empirical studies on the finance–growth nexus in China remained rare until the early 2000s. Some of the most influential cross-country studies (see Beck et al., 2000; King & Levine, 1993a, 1993b, 1993c; Levine et al., 2000) did not include China in their datasets because of unobservable or missing data. It was not until Liu and Li (2001) and Aziz and Duenwald (2002) that research focused on China.

2.5.1 Early cross country studies and financial indicators

Goldsmith's (1969) study is one of the earliest and most influential on the nexus of finance and growth. Goldsmith examined the correlation between financial development and economic growth from 1860 to 1964[2] with a dataset comprising 35 countries.[3] With the assumption that the larger the financial sector, the higher the quality of

[2] Most of the series for developed countries trace back to 1880; and for five particular countries, the data traces back to 1860. Some less developed countries in the sample could only be traced to 1880 or 1900.

[3] The dataset included 35 countries (19 developed countries and 16 LDC), with two socialist economies (the Soviet Union and Yugoslavia) included in this number.

services it provides, Goldsmith roughly examined the correlation between the size of a financial intermediary sector and economic growth, concluding that there is a positive relationship between these two. However, the limitations of his study are obvious. The first limitation is it included only 35 countries, which is insufficient for a cross-country study. The second limitation is that some factors that can significantly affect economic growth were not systematically controlled (Levine, 1997). Furthermore, in measuring financial development, there can be a problem of two levels of inaccuracy. At one level, the size of a financial sector may not appropriately reflect the functions of a financial system, and the expansion of scale may not be equal to the development of the sector, given the importance of efficiency in the finance industry. At a second level, the measurement of a financial sector by one particular variable may not be sufficient to reflect all the dimensions of the scales of a financial system.

Goldsmith's pioneering study was the first attempt to explore the role of a financial system in economic growth. Despite its limitations, it inspired later research in the context of cross-country analyses. Some questions continue to remain unclear, including the causality between finance and growth (does finance promote growth or vice versa) and not knowing which part of the financial system affects growth (financial intermediaries, financial market, or a mix).

It was not until the early 1990s that many economists touched on this topic again, following the development of the endogenous growth theory and theoretical models. King and Levine (1993a) extended Goldsmith's dataset into 77 countries and from 1960 to 1989, and examined whether financial development affects economic growth through capital accumulation and productivity growth. According to their results, it can be argued that financial development, measured by the four financial development

indicators, significantly boosts economic growth through capital accumulation and productivity growth. To examine the causality between finance and growth, King and Levine (1993a) applied the value of the financial indicator in 1960 into their regression, and found that financial development can be a predictor for future economic growth. This “finance lead growth” perspective was further confirmed and supported by Levine and Zervos (1998).

Another contribution from King and Levine (1993a) is the construction of several financial intermediary indicators, which measures the relative efficiency of banking systems (financial intermediaries). The financial indicators that they developed are now widely used as the standard measurements for financial systems in studies (Beck et al., 2000; King & Levine, 1993b; Levine et al., 2000). The concept of the first indicator, financial depth, was adopted from Goldsmith (1969) and McKinnon (1973). Financial depth is defined as the ratio of liquid liabilities (M3) to GDP (M3/GDP), which has been improved from a comparatively narrow monetary measurement (e.g., M1) to a broader one. However, this measurement can only reflect the level of finance development, not its efficiency. A higher M3/GDP ratio does not imply a higher level of financial development, if development is defined in accordance to the theoretical finance–growth models in the mainstream doctrine (i.e., better efficiency in financial resources allocation). The ratio of M3/GDP refers to the monetization level in one economy, or the level of financial deepening (defined as the ratio of financial assets to GDP), which reflects only one part of a country’s financial development. Levine and Zervos (1998) argued that the increase in the ratio of liquid liabilities to GDP does not mean an increase in credit provision in an economy, because it is not clear whether the increase in liabilities is from commercial banks, other financial intermediaries, or the central bank.

The second indictor is a country's "bank," which is the ratio of total assets of commercial banks to the sum of domestic assets in commercial banks and a central bank. The assumption behind this indicator is that commercial banks are better than central banks at efficiently allocating financial resources through the four financial functions. The limitation of this indicator is obvious. First, commercial banks are not the only type of financial intermediation, and second, in some developing countries, such as China, the banking industry is dominated by state-owned banks (SOBs). Therefore, a banking industry may face strong interventions from the government, both directly and indirectly.

The third, and final, financial indicator is "private,"[4] and it is the ratio of credit issued from the private sector to the GDP, which implies that the more credit issued to the private sector, the more efficient the financial system is in resources allocation. What is worth noting is that the underlining presumption is that the private sector uses funds more efficiently than the public sector. King and Levine (1993a) argued that although the second and third indicators may not reflect the size and efficiency of a financial system directly, when combined with the first indictor, measurements complement the finance–growth nexus.

2.5.2 Contemporary panel studies

With the development of econometric technology, accounting for both cross-sectional

[4] There are four indicators adopted in King and Levine's (1993a) study, but two are concerned with credit issued to the private sector; one is the ratio of credit issued to the private sector to total credit issued, and the other is the ratio of credit issued to the private sector to the GDP. These two indicators are considered the same for this thesis.

analyses and time dimensions, using panel datasets and related econometric techniques have dominated finance–growth empirical studies in recent years. The advantages of using a panel technique are obvious. For one, according to Hsiao (1986), it can enlarge the number of observances in a dataset by introducing a time dimension. Second, Levine et al. (2000) pointed out that a panel technique can effectively control for unobserved section-specific effects, which are classified as the error term in regressions with pure cross-sectional data. For country-level studies, empirical results show that the development of a financial system can positively accelerate economic growth (Beck & Levine, 2002, 2004; Beck et al., 2000; Benhabib & Spiegel, 2000; Levine et al., 2000; Rousseau & Wachtel, 2000, 2002). Studies at the firm and industry levels found that financial development can largely affect the growth of firms and industries by easing constraints of external finance and stimulating investment (Demirguc-Kunt & Maksimovic, 1998; Rajan & Zingales, 1998; Wurgler, 2000).

Another trend in the literature is to add stock markets to empirical models. In Arestis, Demetriades, and Luintel (2001), banks and stock markets can be seen as substitutive sources for corporate finance, so estimating banking sector development would only lead to a bias in assessing the finance-growth nexus. Focusing on providing liquidity, empirical results show that stock markets can significantly stimulate growth (Atje & Jovanovic, 1993; Beck & Levine (2004); Demirguc-Kunt & Maksimovic, 1998; Levine & Zervos, 1998; Rousseau & Wachtel, 2000; Shen & Lee, 2006).

By employing instrumental variables in the debate of whether the banking sector or stock markets promote economic development more effectively, a view of law and finance emerges. The theoretical assumption is straightforward because modern finance is based on contracts; legal origins can influence law systems by protecting investors'

rights and enforcing contracts. These, in turn, can to a certain extent affect the efficiency and structure of financial systems. La Porta et al. (1998) first introduced legal origins as instrumental variables. In a regression model, Levine et al. (2000) used the same set of legal origins, and found that by controlling for the effect of legal origins, the linkage between financial intermediary development and long-term growth remained positive. Furthermore, their results also showed that legal origins could be vital in determining financial development. Levine (2002) and Beck, Demirgüç-Kunt, and Levine (2003) later confirmed these results. In particular country studies, Allen et al. (2005) associated the legal sector with the finance–growth nexus in their comparison study of China and other economies, and found the connections are complex.

2.5.3 Limitations of cross country studies

Most of the cross-country, regression-based empirical tests are designed according to the regression model by Barro (1991), and modified with additional financial indicators or instrumental variables. Ang (2008) argued that the single equation approach is too simple to explain the complex relationship between finance and growth. In contrast to the theoretical literature on the finance–growth nexus, which assumes a two-way causal relationship between finance and growth, most empirical studies take the view that finance leads to growth and treat financial indicators as independent variables in their regressions. In this latter view, theoretical models and empirical studies are disconnected because this is a conceptual problem.

Putting finance and growth indicators on two sides of the same equation led to the idea that financial development affects economic development. A positive finance–growth relationship that has been investigated statistically to determine whether, like in the

mainstream literature, finance spurs growth by easing market frictions or through other ways that are hard to prove. As proposed by Aziz (2008), simply testing the correlation between financial development proxies and economic growth cannot capture the connection between finance and growth, especially in fast-changing economies, such as in China and India. Aziz wrote that the mechanism between finance and development is "more deep rooted and complicated" (Aziz, 2008, p. 5).

Data limitation is another restriction. The wide use of aggregated data across countries causes the inability to distinguish country-specific effects. As Solow (2001) argued, although different economies may share some common features, distinctive characteristics still exist. This raises a second issue: grouping countries in different ways can lead to different conclusions. Fernandez and Galetovic (1994) argued that if King and Levine's (1993a) dataset were divided into OECD (Organization for Economic Co-operation and Development) and non-OECD countries, the supposed positive correlation in OECD countries would become insignificant. For example, if Japan were excluded from the OECD country sample, the correlation would be essentially zero. Driffill (2003) indicated that in Levine and Zervos's (1998) dataset, the significance of financial indicators in the regression is largely due to the strong growth performance of the Asian Tigers before the 1997 Asian crisis. By controlling for legal and social factors in Levine and Zervos's (1998) dataset, Garretsen, Lensink, and Sterken (2004) found that there are no positive links between stock market development and economic growth. Rousseau and Wachtel (2011) reassessed the results from King and Levine's (1993a) influential study. By extending the original timeframe of 1960–1989 to 1960–2004, Rousseau and Wachtel argued that the significant and positive linkage between financial and growth indicators tended to diminish after 1989, and the reason, suggested by the authors, is the increasing frequency of financial crises starting

in the late 1970s. Their conclusion is that financial development, as measured by financial deepening, may not always have a positive effect on economic development. Excessive and rapid financial deepening can also bring inflation and financial crises.

A third potential bias was raised by Ang (2008): Without considering the complexity of the evolution of financial environments and historical aspects of economic development, general cross-country analyses cannot capture specific features of a country. A global-level positive relationship between financial development and economic growth can be negatively or positively affected by the performance of an individual country or by exogenous shocks. Demestriades and Hussein (1996) reported that the experiences of economic development and financial development from different countries are all treated as homogeneous entities, which can hardly reflect the differences of institutional and structural characteristics across countries.

The lack of high-quality data to measure country-specific effects, or not considering individual countries' financial backgrounds, development paths, or other historical contexts, could affect the robustness of empirical results obtained from cross-country finance–growth studies and leave related policy implications unanswered.

2.5.4 Time series studies and limitations

Along with using cross-country regressions, another trend in the empirical literature on finance and growth is to employ time series analyses in particular county case studies. The main advantage of this approach is that it makes it possible to formally test the causality between finance and growth. In other words, the question of whether finance leads or follows growth can be examined systematically. During the 1990s, in the evolution of econometric techniques, normal vector autoregressive models (VARs) and

Granger-type causality tests dominated time series-based empirical studies (see Demetriades & Hussein, 1996; Gupta, 1984; Jung, 1986). More recently, empirical studies have employed the error-correction model (ECM), the vector error-correction model (VECM), principal component analysis (PCA), and other advantaged time-series approaches (see Arestis & Demitriades, 1997; Arestis et al., 2001; Arestis, Luintel, & Luintel, 2004; Demetriades & Hussein, 1996). Developed by Johansen (1988, 1991), the ECM and VECM methods make it possible to test the long-term causality between finance and growth.

For constructing financial development indicators, similar indicators are adopted when comparing cross-country studies. Two common indicators, the ratios of M2/GDP and M3/GDP, are used to measure the size of a financial system. The ratio of bank credits issued to the private sector to GDP (private credits/GDP) is applied to measure the development of the banking sector, while the measurement of stock market development largely follows the work by Levine and Zervos (1998), using the total value of domestic shares and the trading value of domestic exchanged to measure stock markets activities.

While many empirical studies detected a positive correlation in the finance–growth nexus, results for causality were mixed across countries. Some studies suggested a one-way causal relationship, from finance to growth (Bell & Rousseau, 2001; Gupta, 1984; Jung, 1986; Neusser & Kugler, 1998; Rousseau & Vuthipadadorn, 2005). Other studies showed the reverse (Arestis & Demetriades, 1997; Demetriades & Hussein, 1996). Some studies, meanwhile, indicated a bi-directional causality (Luintel & Khan, 1999).

In examining whether the banking sector or stock markets promoted higher growth,

Arestis et al. (2001) found a negative correlation between stock markets and economic growth in Japan, France, and the United Kingdom. They argued that stock markets and banking sectors are substitutive sources for corporate finance, and that an overemphasized stock market implies that the structure of a financial system does matter.

There are two key issues in a time series approach. The first is the restriction of the time span of the dataset. Theoretically, in some time series methods, for example, the VAR approach, the frequency of a dataset has little impact on the final results, which means that the choice of annual, quarterly, or monthly data would not bias the empirical results. This is true, however, only if there are enough observations, that is, a sufficient time span of the dataset. To explore a long-term relationship between finance and growth, time series-based empirical results are sensitive to the time span. The majority of studies developed datasets in a range of 20 to 50 years, but even 50 years may not be long enough to produce reliable and accurate results.

A more serious problem is the reliability of the Granger causality test. In a single regression equation, if variable X helps predict the future value of variable Y, then X Granger-causes Y. Demetriades and Andrianova (2004, p. 43) found that X Granger-causes Y does not have the same meaning as X causes Y. It is very likely that there exists another unobserved factor, Z, which is the true cause of both X and Y. Therefore, X Granger-causes Y only suggests that X contains some information to predict the future time path of Y. As suggested by Demetriades and Andrianova (2004), an appropriate version of expression from the results of the finance–growth nexus Granger causality test is that finance is a leading indicator of economic growth, or vice versa.

2.5.5 China case studies

Before reviewing the empirical studies of the finance-growth nexus in the Chinese economy, three points need to be raised. First, China is a large country with 31 provinces,[5] making it possible to apply a cross-sectional analysis by using a provincial-level dataset. Second, since the late 1970s, China has undergone remarkable economic reform, transitioning from a Soviet Union-type model to a more market-oriented one. This implies that it would be appropriate to apply Western economic theory, which draws on market economy, in the context of China's post-1978 economy. Third, as a transitional economy, some economic data is not available, especially from early in the transition. Although the National Bureau of Statistics of China has made great efforts to trace historical economic statistics under the System of National Accounts, missing data, especially at the province and city levels, is still very common. Therefore, it is not surprising that financial development in China is usually assessed with alternative financial development indicators that slightly differ from those employed in global-level or regional-level cross-country studies.

It is not surprising therefore that China has been excluded in some of the most influential cross-country studies. It was not until the early 2000s that more studies focused on China, in both cross-country and single-country case studies. By constructing a provincial-level dataset, the majority of China's case studies applied panel analyses, while more recently some studies have applied time series analyses. A summary of major finance-growth studies on China is presented at the end of this chapter in Table 2.2.

[5] Actually, there are 31 administrative regions in China, including 27 provinces and 4 Direct Administrative Municipalities.

Because of the unavailability of provincial-level M2 and liquid liabilities data, most panel studies developed their indictors by using the ratio of domestic bank deposits to GDP to measure the size of a banking sector at the provincial level (Boyreau-Debray, 2003; Cheng & Degryse, 2010; Hao, 2006; Ren, 2007). In national time series studies, both the ratio of M2 to GDP and the ratio of domestic bank deposits to GDP are employed to measure the size of a banking sector (Fan, Jacobs, & Lensink, 2005; Jalil & Ma, 2008; Liang & Teng, 2006; Liu & Shu, 2002). Another proxy is the ratio of loans extended by SOBs to GDP (Boyreau-Debray, 2003; Hasan & Zhou, 2006; Hao, 2006). The assumption is that SOBs may prefer to issue credit to even unprofitable, inefficient state-owned enterprises (SOEs), given their close relationship with the government. Therefore, this indicator attempts to measure the efficiency of allocating financial resources of the financial system as a whole by measuring the (in)efficiency of credit provision from the SOBs. An alternative indictor for the ratio of loans from SOBs to GDP is the ratio of total credit issued to the private sector to GDP (private credits/GDP) (Guillumont-Jeannency, Hua, & Liang, 2006; Jalil, Feridun, & Ma, 2010; Liang, 2005, 2008; Shan, Feridun, & Ma, 2001). However, the use of private credit to GDP ratio could underestimate the degree of financial deepening in China, given that many types of enterprises, even those with foreign funds, are both SOEs and private enterprises, that is, mixed ownership (Zhang, Wan, & Jin, 2007, p. 40). Purely private-owned enterprises were still limited. Drawing on this point, Zhang et al. (2007, p. 41) developed an alternative financial deepening indictor, namely credit issued to non-SOEs over GDP ratio. To construct this variable, given that the proportion of credit extended to SOEs over total credit at the province level is not publicly available, Zhang et al. generated SOEs' shares of total credit granted with the proxy of SOEs' shares of total output, with the assumption there is a strong correlation between SOEs' share of total credit and their

output share.

Litter effort has been made to measure the development of the stock market in China, and the reason is quite simple. Being launched in the early 1990s, the Chinese stock market has grown quickly with the establishment of the Shanghai Stock Exchange and Shenzhen Stock Exchange. However, overall, they share a comparatively small stake in all financial activities. In other words, the importance of the stock market in China is not nearly as vital as the banking sector. According to the empirical results from Ren (2007), who applied three traditional stock market indicators with the reference of Levine and Zervos (1998), plus an indicator for the daily percent change of the Shanghai composite price index, into a growth equation, there is no causal relationship between the development of stock markets and economic growth in China.

Generally, the empirical results from study to study are mixed. In some pioneering studies, a positive relationship between financial development and economic growth was not identified (Aziz & Duenwald, 2002; Boyreau-Debray, 2003; Chang, 2002). The connection between banking sector development and growth in China is certainly weak. As argued by Boyreau-Debray (2003), this could be due to the dominance of SOBs in China's banking industry and because of the high volume of nonperforming loans (NPLs) in SOBs. These could have a strong negative effect on China's overall economic performance. In more recent studies, a positive finance–growth linkage has been captured (see Cheng & Degryse, 2010; Hao, 2006; Li, 2009). The results from Granger-type causality studies are, however, mixed. Liang and Teng (2006), Shan et al. (2001), and Shan (2005) all suggested a one-way causal connection from economic growth to financial development. Liu and Shu (2002) argued that the linkage is two-way, while Chang (2002) and Ren (2007) indicated that the association between these two

variables in China are negligible and independent.

In Demetriades and Andrianova (2004), the positive relationship of the finance–growth nexus is accepted as measured by a long-term growth rate or by the level of per capita GDP, though what is less sure is the causality. Looking at empirical data on China, the situation is quite similar. A positive relationship has been largely captured in existing studies, but the causality remains complex. Studies are now using larger databases and more advanced econometric methods, but determining how to gain better measurement of financial development to link both theory and evidence remains vital.

2.5.6 Limitations of China's case studies

Although most of the case studies on China suggest a positive relationship between financial development and economic growth, it may only imply a positive correlation between the size of its financial sector and economic growth, given that the links between theories and evidence are becoming out of touch with each other. Theoretical models emphasize the efficiency of a financial system, but empirical studies measure size. A larger financial sector does not mean a better match of savings and investment or the ability to create credit more efficiently.

When talking about the limitations of case studies on China, the main critique is the "simple applying" approach using international experience. Existing empirical methods on the finance–growth nexus are based on the theoretical models developed from the observations and experiences of more advanced Western economies. Therefore, a "simple applying" solution largely neglects some specific features of the Chinese economy. In order to achieve a better understanding of the finance–growth nexus in

China, its financial structure, institutional organization, economic reforms, and some historical contexts need to be taken under consideration. Although applying provincial-level data in China, rather than cross-country analyses, allows for some control of specific features of the Chinese economy, it is worth noting that the "decentralization" strategy of the state government body since 1994 may lead to certain levels of bias. The continuous process of industrialization mainly drives China's economic, so how well SOBs support local, industrial SOEs is vitally important. That is to say, different developmental policies, advocated by different levels of governments from region to region, can lead to different local financial-sector performance, and thus industrial performance.

Continuous liberalization, commercialization, and internationalization are three main aspects of China's economic reform, but at the same time China's financial system remains a mixed system with strong market-supplanting elements (Lo et al., 2011). According to the basic assumption of mainstream literature, in which the private sector is seen as more efficient than the state sector, the Chinese financial system is labeled as inefficient because of the dominance of SOBs and the continual lending to SOEs. However, when linking China's so-called inefficient financial system with its overall economic performance over the past 30 years, it is hard to explain how this financial system supported remarkable economic achievement. The conclusions of such empirical studies on finance–growth in China are quite similar, no matter what empirical results have been produced: positive, negative or insignificant. The similarities are that if finance accelerates growth in China, the gains are mainly due to market-oriented reforms; and if a positive nexus is not found, the most likely reason is insufficient market-oriented reforms.

The rationality for using China-specific financial development indicators — such as the percentage of loans extended from SOBs to GDP — to measure efficiency of the financial system is based on presumptions that may not be substantially valid in an impure market-oriented economy with an impure market-determined system. Whether SOBs are comparatively less efficient than non-SOBs or whether the private sector uses funds more efficiently than SOEs remains debatable.

The East Asian miracle[6] and the China "miracle" show the importance of the role of government in guiding economic development. Under certain circumstances, governments can process information and allocate resources more efficiently when there is market failure and information asymmetry. Even in the neoclassical tradition, Andrianova, Demetriades & Shortland (2012) developed their models to determine the influence of government ownership of banks on economic development by extending and reexamining the dataset in La Porta, Lopez-De-Silanes & Shleifer (2002). According to Andrianova et al.'s results, from a sample of 128 countries studied between 1995 and 2007, government ownership of banks was not harmful to economic development. This is not surprising, because the economies of countries with SOBs generally grow faster than those without SOBs.

Empirical studies on the Chinese finance-growth nexus following the neoclassical approach explain only part of the story. For example, how financial development mechanisms affect economic growth (the interaction between savings and investment) has not been studied, so that the interactive linkages between finance and real sector development remain unclear. Additionally, financial development indictors cannot be

[6] The East Asian miracle referred the strong economic performance of Hong Kong, Singapore, South Korea, and Taiwan (i.e., the four Asian Tigers) between the early 1960s and 1990s.

used to directly assess efficiency, and the application of some indictors are questionable because their usage is based on presumptions that hold only in pure market economies.

2.5.7 Investigation of the interaction between financial systems and economic development in China

A small number of studies have tried to assess the finance–growth nexus through alternative approaches. One approach is to emphasize the infeasibility of applying commercial criteria to analyze China's financial system. For Laurenceson and Chai (2003), a feature of China's banking sector, especially in the SOBs, is the continuous embodiment of both commercial and developmental attributes started in the late 1970s. The objective of SOBs is not only profit-oriented, but also development-oriented. SOBs facilitate real sector development by enhancing the productivity of industrial enterprises, stimulating capital accumulation, and correcting market failures. However, SOBs are also responsible for social development objectives, such as social safety improvements and easing of regional inequalities. Therefore, a purely profit-oriented assessment of a mixed financial system is not appropriate. From the angle of promoting social development, lending behaviors of SOBs, especially in the first half of the reform period, share some of the features of fiscal expenditures.

Lo et al. (2011) also emphasize a mixed financial system with strong market-supplanting elements. The empirical results of Laurenceson and Chai's and Lo et al.'s studies largely show that China's SOB-dominated banking sector has supported China's economic development quite well. As stated above, in the mainstream doctrine, one reason SOBs are considered inefficient is their continual lending to SOEs. Laurenceson and Chai (2003) and Lo et al. (2011) started with different focuses, yet

both rejected this argument. Laurenceson and Chai reexamined the relative productivity of SOEs in China, and argued that the efficiency or productivity of SOEs is not as low as expected in mainstream studies, when under the context of state and non-state sector comparison. They found that a particular contribution of the Chinese financial system is selecting and lending to productive SOEs. Lo et al. insisted on the importance of introducing alternative theories to broaden the field of vision. By introducing the concept of "productive efficiency" in the Chinese financial system, from the Keynesian-Schumpeterian theory of credit creation, Lo et al. found that it is the strong market-supplanting elements in the Chinese financial system that made significant contributions to China's economic development, in which productive efficiency gains in the financial system outweighed the losses in allocative efficiency. Sun (2006) tested the hypothesis of endogenous money from different schools of endogenous credit supply in the post-Keynesian tradition by investigating endogenous finance mechanisms that actively deliver economic development through the savings–lending behavior of Chinese banks.

A second approach is to indirectly analyze the efficiency of financial systems by assessing investment and financial interactions in economic growth. This approach evaluates the interactions of capital accumulation and the productivity of capital and economic development from the perspective of finance. The hypothesis behind this approach is straightforward: if financial development happens during certain periods, a financial system should channel savings into more productive investment and provide increased financial resources to more projects. These actions can be observed through either an increased pace of capital accumulation or increased productivity of capital. Xiong (2010) estimated the relationship between investment efficiency, real interest rates, and financial deepening by applying a provincial dataset that covered 1987 to

2004; the results showed that financial development has made positive and significant contributions to investment efficiency overall, especially in the industrial and service sectors. In this study, investment and financial development efficiencies were estimated using the Incremental Capital Output Ratio (ICOR). He (2003) designed his model to assess financial development, and examined the cointegration linkage among the following three variables: the ICOR, the share of funds channeled by financial intermediation in total fixed asset investment, and total fixed asset investment as a proportion of GDP. The main results from He are in line with Xiong, who captured a positive correlation between financial development and investment efficiency. He further indicated that between 1981 and 2002, financial intermediation did a better job of supporting investment expansion than improving investment efficiency. This same result was found by Lo et al. (2011).

Zhang (2005) also emphasized the efficiency of investment. Following the logic that financial development increases investment efficiency and the enhancement in investment efficiency spurs economic development. Zhang (2005) focused on the second part of this story. By comparing the ICOR of the state-owned sector to the non-state sector, Zhang found that the overall investment efficiency of the Chinese economy has improved since the early 1980s, and that it is largely due to the rapid and efficient improvements made in the non-state sector. However, at the same time, the financial system still channels the majority of its financial resources into the state sector. Therefore, without further financial sector reforms, especially in lending behaviors, China's future growth could be affected.

Feldstein-Horioka (1980) examined cross-regional capital mobility as reflections of the level of financial integration and the allocative efficiency of a financial system. The

hypothesis used is simple and straightforward: If there is a perfect capital mobility in one economy across regions, which implies an overall efficient financial system that can overcome market frictions, there should not be a correlation between aggregate savings and investment at the regional level. Both Boyreau-Debray and Wei (2004, 2005) and Li (2010) examined the relationship between provincial-level savings and investment in post-1980 China, and they observed significant Feldstein-Horioka coefficients, which indicates a relatively slow movement of capital across the provinces. Incremental savings inefficiently retained inside the provinces cannot fuel more productive investment across the provinces. This certainly shows a relatively low degree of nationwide financial integration across China.

One possible explanation for this, as proposed by Boyreau-Debray and Wei (2004, 2005), is that there is inefficient resource allocation in state-controlled sectors. By breaking down China's aggregated investment data, by the source of funds over the period from 1984 to 2001, Boyreau-Debray and Wei found that only investments channeled by foreign direct investment and self-raising funds were positively correlated with marginal productivity of capital. For investment channeled by government budgets and loans from SOBs, the relationship became negative. A different explanation was offered by Watanabe (2006), who took the position that the relative inactive nationwide movement of capital was a result of the joint effect of the pace of fiscal reform and financial system reform. According to Watanabe, from 1985 to 1998, when the pace of fiscal reform was faster than that of capital market development, a weaker cross-broader capital movement was observed, but after 1998, when capital markets showed a faster development, the converse occurred.

2.6 Conclusion

In this chapter, theoretical and empirical studies on the relationship between financial development and economic development were reviewed. In the review of the theoretical literature, theoretical models were broken into three groups: the financial liberalization model, the endogenous financial intermediation model, and the functional financial development model.

In Section 2.2, the original financial repression models of McKinnon (1973) and Shaw (1973) were discussed, including that these models argued that financial liberalization would lead to an increase in both savings and investment levels, and hence lead to capital accumulation and growth. However, the financial liberalization theory suffers from criticisms from neostructural scholars, who instead emphasize the role of informal, even black financial markets, in developing economies. Furthermore, the disappointing results from the application of financial liberalization in Latin American economies in the 1980s further question the validity of the theory. In Arestis and Stein (2005), the failure is not due to a sequencing problem, but to a natural weakness of the financial liberalization theory: neglecting to consider the institutional endowment of a financial system.

Section 2.3 reviewed more contemporary finance–growth theoretical models, under the framework of endogenous growth models from the neoclassical doctrine. New growth models assume a constant return to scale, or even an increase in return to scale in growth determination. Scholars developed models by assuming an endogenous financial intermediation in growth determination. Drawing on the concept of market frictions (informational asymmetry and transaction costs), an endogenous financial

intermediation is assumed to overcome or smooth over such frictions. A two-way causal relationship between financial sector and real sector development has been emphasized in these models.

A functional view of financial development, which contains theoretical aspects of the mainstream doctrine and the Keynesian–Schumpeterian theory of endogenous finance, was reviewed in Section 2.4. Two efficient attributes of financial development were distinguished: the allocative efficiency view and productive efficiency view of financial development. The key differences between these two efficiencies can be traced to the starting point of these two theoretical perspectives. The mainstream view of allocative efficiency treats finance as a process of channeling savings into investment funds and, hence, creating investment; but in the Keynesian–Schumpeterian view of endogenous finance, the process of finance starts with the demands of investment of entrepreneurs, and hence banks' ability to fulfill such willingness. In other words, according to the productive efficiency view, the finance process moves from investment to savings. Furthermore, it has been argued that these two efficiencies are more likely to be complementary than substitutive to each other, as their starting points focused on different aspects of the same issue.

Section 2.5 surveyed empirical studies of the finance–growth nexus. Cross-country and times series approaches were reviewed, and the limitations of both approaches were discussed. The literature on finance and growth in China was reviewed, and it was argued that without assessing the mechanisms of how financial development interacts with real sector development in a transitional economy, a "simple applying" approach can be biased. Finally, alternative approaches that assess the interactive relationships between finance and development in China were reviewed. Theses alternative

approaches include emphasizing market-supplanting elements of the Chinese financial system, assessing the efficiency of aggregated investment, and studying the interaction between aggregated savings and investment.

Table 2.2 Studies of finance and growth

Author(s)	Methodology	Data coverage	Time span	Financial development indicator(s)	Growth indicator(s)	Main findings for China
Cross-Sectional and Panel Regression Studies						
Aziz & Duenwald (2002)	Fixed-effects, panel regressions	Provincial panel, 27 provinces	1988-1997, annual	1. Bank loans/GDP 2. Bank loans to non-state sector/GDP	1. Real GDP per capita growth 2. Total factor productivity 3. Investment/GDP	Financial development: no significant growth in provinces.
Boyreau-Debray (2003)	1. First differenced GMM, dynamic panel regressions 2. System GMM, dynamic panel regressions	Provincial panel, 29 provinces	1990-1999, annual	1. SOB credits/GDP 2. Bank deposits/GDP 3. SOB loans/ deposits 4. Banks concentration index	Initial real GDP per capita	Financial deepening: no contribution to local economic performance. Bank credit: negatively correlated with provincial economic growth.
Cheng & Degryse (2010)	1. Fixed-effects, panel regressions 2. System GMM, dynamic panel regressions	Provincial panel, 27 provinces	1995-2003, annual	1. Bank deposits/GDP 2. Bank credits/GDP 3. Non-bank deposits/GDP 4. Non-bank credits/GDP	1. Real GDP per capita growth 2. Initial real GDP per capita 3. Real per capita capital stock growth 4. Initial real GDP 5. Real capital stock growth	Financial development: significant increase in economic growth. Non-bank financial institutional development: negatively correlated with economic growth.
Guillaumont-Jeannency et al. (2006)	System GMM, dynamic panel regressions	Provincial panel, 29 provinces	1993-2001, annual	1. Credits issued to private sector/GDP 2. Credits issued by other than the four SOBs/total credits	1. Total factor productivity 2. Technical efficiency growth	Financial development: significant increase of China's total factor productivity growth.

				3. Credits issued to public sector/GDP	3. Technical progress growth	
Hao (2006)	System GMM, dynamic panel regressions	Provincial panel, 28 provinces	1985-1999, annual	1. SOB loans/GDP 2. Household savings deposits/GDP 3. Fixed asset investment finances by loans/financed by state budgetary	Initial real GDP per capita	Financial development: significant increase in economic growth, but loan expansion does not promote growth.
Hasan & Zhou (2006)	Fixed-effects, panel regressions	Provincial panel, 31 provinces	1986-2002, annual	1. SOB loans/GDP 2. Loans by non-state banks/total loans 3. Corporate bonds issuance/GDP 4. Number of listed firms/total firms	Initial real GDP	Financial markets and institutional development: significant increase in economic growth.
Li (2009)	1. Pooled OLS, panel regressions 2. Fixed-effects, panel regressions 3. Random-effects, panel regressions	Provincial panel, 26 provinces	1980-2004, annual	1. Loans/GDP 2. Household savings deposits/GDP 3. Loans/state budget for capital construction and enterprise innovation 4. Banks concentration index	1. Initial output per worker 2. Productivity improvements in terms of level 3. Physical capital accumulation in term of level 4. Output per worker growth 5. Productivity improvement in growth term 6.Physical capital accumulation in	Effects of financial development to economic growth are sensitive to selection of growth indicators; relationship between finance and growth appears long-term.

					growth term	
Liang (2005)	System GMM, dynamic panel regressions	Provincial panel, 29 provinces	1990-2001, annual	1. Loans/GDP 2. Credits issued by other of the four major SOBs/Total credits 3. Credits issued to private sector/GDP	Real GDP per capita growth	Financial development: significant increase in economic growth. Government deregulation in financial sector: promotes economic growth.
Liang (2008)	1. System GMM, dynamic panel regressions	Provincial panel, 29 provinces	1990-2001, annual	1. Loans/GDP 2. Credits issued by other then the major SOBs/total credit 3. Credit issued to private sector/GDP	Initial real GDP per capita	Financial development: significant increase in economic growth in coastal provinces, not in inland provinces.
Ren (2007)	1. Fixed-effects, panel regressions 2. Random-effects, panel regressions	Provincial panel, 30 provinces	1985-2002, annual	1. Bank deposits/GDP 2. SOB loans/deposits 3. Bank loans/GDP 4. Banks concentration index 5. Credit issued by four SOBs/total credits	Real GDP growth	Financial development: no significant economic growth. All five financial indicators negatively related to GDP growth.
Zhang, K. (2003)	Fixed-effects, panel regressions	7 East and Southeast Asian countries and China, national level	1960-1999, annual	Liquid liabilities (M3)/GDP	Real GDP growth	Linkage: nothing significant between financial development and economic growth in 8 East Asia countries.
Zhang et al. (2007)	GLS, panel regressions	Provincial panel, 29 provinces	1987-2001, annual	Bank loans to non-state enterprises/GDP	Total factor productivity	Financial deepening: significantly boosts productivity growth.

Time Series Studies						
Chang (2002)	1. Multivariate VAR model 2. ECM 3. Granger causality test	Time series, national level	1987-1999, quarterly	Monetary survey/GDP	Initial real GDP	Financial development and economic growth: relationship is independent. Demand-following and supply-leading hypotheses: neither is significance.
Fan et al. (2005)	1. VECM 2. Granger causality test	Time series, national level	1992-2004, quarterly	1. M2/GDP 2. Bank credits/GDP 3. Market value of all listed shares/GDP	Initial GDP	Financial deepening and banking sector development: promote long-term economic growth but effect of stock market is negative.
Jalil & Ma (2008)	1. ARDL 2. ECM	Time series, China and Pakistan, national level	1960-2005, annual	1. M2/GDP 2. Deposits/GDP 3. Bank credits/GDP	Real GDP per capita growth	Financial development and economic growth: positive but insignificant relationship.
Jalil et al. (2010)	1. ARDL 2. ECM 3. PCA	Time series, national level	1977-2006, annual	1. Liquid liabilities (M3)/GDP 2. Credits to private sector/GDP 3. Commercial bank assets/Commercial bank and Central bank assets	Real GDP per capita growth	Financial development: fosters economic growth
Liang & Teng (2006)	1. VARs 2. Granger causality test	Time series, national level	1952-2001, annual	1. Bank credit/GDP 2. Deposits/GDP	Initial real GDP per capita	Financial development: positively correlated with economic growth; causal relationship is one-way (economic growth to financial development).
Liu & Shu (2002)	1. VARs 2. ECM 3. Granger causality test	Time series, national level	1983-1997, quarterly	1. M2/GDP 2. Domestic Credits/GDP	Real GDP per capita growth	Financial development and economic growth: relationship between is positive and significant; causal relationship is two-way.

Ren (2007)	1. VARs 2. Granger causality test	Time series, national level	1995-2004. monthly	1. Bank loans/Industry value-added (IVA) 2. M2/IVA 3. Market value of all listed shares/IVA 4. Tradable domestic shares/IVA 5. Trades of domestic share/tradable market capitalization 6. Daily percent change of Shanghai composite price index	Real IVA growth	No evidence that banking sector plays leading role in economic growth. Combined with financial markets, results shows that financial development is effect, not cause, of economic growth.
Shan et al. (2001)	1. VARs 2. Granger causality test	Time series, 9 OECD countries and China, national level	1986-1998, quarterly	Bank Loans to private sector/GDP	Real GDP per capita growth	Economic growth to financial development: one way causal relationship
Shan (2005)	VARs	Time series, 10 OECD countries and China, national level	1985-1998, quarterly	Total credits	Real GDP growth	Economic growth to financial development: one way causal relationship.
Zhang, K. (2003)	OLS	Time series, 7 East and Southeast Asian countries and China, national level	1960-1999, annual	Liquid liabilities (M3)/GDP	Real GDP growth	Association between finance and growth s negligible.

Note: ARDL = autoregressive distributed lag model; ECM = error-correction model; GLS = generalized least squares; GMM = generalized method of moments; OLS = ordinary least squares; PCA = principal component analysis; VAR = vector autoregression models; VECM = vector error-correction models.

Chapter 3

Economic reform and financial sector reform in China

3.1 Introduction

Before starting an analysis of China's financial development, the major features of the Chinese economy will be discussed so as to provide a comprehensive background. Following this discussion, China's financial reforms will be assessed in the order of phase of the reform and key events.

Financial-sector reforms in China started simultaneously with the state's overall economic reforms in the late 1970s. Over more than three decades, the main direction of these reforms can be concluded as "increasing marketization, commercialization and internationalization" (Lo et al. 2011, p. 267). Indeed, by the end of 2011, more than 3,800 banking institutions had been established, as well as nonbanking financial institutions. Financial markets — the money market, bond market, and stock market — were created. These institutions and markets grew rapidly; however, strong market-supplanting elements, which were a legacy of the previous centrally planned period, remained in the system, making China's financial system mixed. These market-supplanting elements, which are largely reflected by state-ownership in the financial sector, means that the Chinese financial system is considered inefficient when judged by pure market principles. Generally, being bank-based, remaining under state influence, and being large but with low efficiency'[7] are the three widely regarded

[7] The efficiency here is in terms of the standard of a pure market-determined financial

features of the Chinese financial system. In Cousin (2007), the French phrase *un géant aux pieds d'argile* (clay-footed giant) has been used to describe the Chinese economy and its financial system: a gigantic and well-performing economy supported by a low-efficiency, frail banking system.

3.2 Background and key aspects of economic reforms since 1978

3.2.1 Background of overall economic reforms since 1978

Prior to 1978, the Chinese economy was marked as a typical administratively heavy, socialist economy that was largely influenced by the Soviet Union model. Starting in the 1950s, the "centrally administrated big push industrialization: strategy had been adopted, as country leaders thought it would be the fastest way to enrich the country (Naughton 2007, p. 5). The result of this strategy, which was used from the 1950s into the late 1970s, not only caused both leaps and retrenchments, but also caused the Chinese economy to be considered abnormal. On the one hand, according to GDP per capita and the levels of urbanization, China was a typical low-income economy; on the other hand, when compared with other low-income economies, the levels of industrialization and energy consumption in China were exceptionally high (Naughton, 2007, p.10). The phenomenon of overindustrialization dominated the pre-reform era, and only since the overall economic reforms starting in 1978 has China gained a normal pattern of development.

system.

3.2.2 A gradual approach of reform

The year 1976 opened a new period of developmental for the Chinese economy, after the Cultural Revolution, which lasted nearly two decades, came to a close. The announcement of the “reform and opening up” policy at the Third Plenary Session of the 11th Communist Party of China (CPC) Central Committee in December 1978 started the economic reforms by abolishing the previous centrally planned model. Unlike the economic reforms in former Soviet Union countries, which adopted “shock therapy” (i.e., a radical, one-step pro-market reform), via neoliberalism, China undertook gradual reforms via the trial-and-error strategy. China’s most fundamental change was to introduce market principles. Various ownerships were introduced into the economy, and the price system was eased. This gradual transition is reflected throughout the entire reform period. For the financial system, the transition from a mono-banking system into a modern financial one was not achieved by adopting a package of policies at one particular time, but rather through the adoption of different reform policies across many years. This evolution of China’s financial reform will be discussed in detail in Section 3.3.

Price liberalization and state-owned enterprise (SOE) reform were part of the gradualism approach. In the pre-reform period, the price of goods and other factors were not determined by the power of the market, but were directly set by the government. Therefore, the first challenges the Chinese government faced were to loosen its control and to introduce a dual-track price system. Before the reforms, all industrial enterprises were state-owned, and the objective was not profits, but completing the production quota set within the state plans. In the dual-track price system, the price of input factors, such as materials used in meeting production quotas, were still fixed by the state, though at far lower than true market prices. Simultaneously, the prices of factors that

used for profit-making purposes became more market-based. Pricing liberalization occurred slowly so as to accommodate the process of overall reform. The removal of SOE production quotas and China joining the World Trade Organization (WTO) were two particularly significant steps in releasing state control of pricing. However, the dual-track price system and price controls still exist. For example, it was not until March 2013 that the dual-track price system for both coal and electricity were finally removed, allowing prices for these commodities to be determined by the market. Originally, *Jia Ge Chuang Guan* (shock therapy of price reform) had been planned by the central government in 1988, but it was postponed because of an unexpected run on banks, caused by the expectation of future high inflation. Radical price reform policies have never been adopted, and the gradualism approach still continues.

To reform China's SOEs, several steps have taken place, which is in line with the gradualism principle. Marketization was the initial reform, in which SOEs were given greater autonomy in their operation and management, and their objectives were gradually switched to be more profit-oriented. The eventual abolishment of production quotas and government subsidies, and the introduction of market-based pricing, led to even fewer interventions from the government on SOEs' operation.

SOEs were finally given financial independence, which meant that their working capital and investment funds were not financed by budgetary fiscal expenditure anymore, but by loans from the banking sector. At the same time, however, this caused a new problem of soft budget constraint, which was followed by the problem of nonperforming loans (NPLs) in the banking sector. Although the financial backing of SOEs had switched from the state to bank credit, the remaining state ownership of both banks and industrial enterprises led to the situation that loans were not generated by pure market principles. When SOEs face insolvency, for example, state-owned banks (SOBs) are always

required by a local government to extend lending or to provide further funds in order to avoid the problems such as unemployment and socioeconomic instability. Such situations nowadays rarely occur because of the deepening of reforms in both the SOEs and the financial sector. On the one hand, banks are becoming more liberal and profit-oriented, so that they do not have to lend to insolvent SOEs. On the other hand, SOEs with financial problems are now allowed to collapse.

Another step occurred with the share-holding reforms of SOEs: the partial privatization of the state ownership. State ownerships in SOEs are reflected by the percent of shares held by state-owned investment companies or different government bodies. When SOEs become publicly listed, institutional investors, as well as ordinary citizens, become eligible to buy and trade the remaining shares in circulation.

SOEs' ownership reform is regarded as the hardest but most important step in China's corporate-sector transition. Unlike the rapid and complete privatization approach adopted in former Soviet Union economies, some state ownership in China has been maintained. In addition to the gradualism principle, the government started another principle during its ownership reform: *Zhua Da Fang Xia*o (grasping the large and letting the small go). According to this principle, SOEs are classified into two groups: important large-sized, or less important small- or medium-sized. SOEs in the first group are usually energy, telecommunication, heavy industrial, and national defense enterprises. For the reason of national security, their state ownership is still retained by the government in the form of state share-holding. For the second type of SOEs, they were allowed, and even encouraged, to transform to private or mixed ownership in order to improve efficiency through market competition and enhanced self-adaptive capacities.

Along with reforming SOEs, ownership reform also took place through the diversification of different ownerships. Foreign investors were first welcomed in 1979 by creating joint-venture enterprises with local companies in special economic zones in the Guangdong and Fujian provinces; after China joined the WTO in 2001, wholly foreign-owned enterprises were allowed to be established. Another initiative was to allow local governments in rural areas to create and pursue Township and Village Enterprises (TVEs) development strategies. The establishment TVEs not only absorbed laborers who had been let go from the agriculture sector in rural areas, but it also deepened the diversification of enterprises' ownership structure.

3.2.3 Economic overview

After more than 30 years of reforms, China's has a "mixed" economic system that is considered a "market socialist economy," because it contains both market resource allocation and state ownership. This system has undergone significant economic development. China's GDP surpassed Japan's, and China became the world's second largest economy, after the United States, starting in 2010. In 2011, the nominal GDP of China's economy reached 47,310 billion CNY (USD 7,318 billion). Table 3.1, which includes select economic indicators for China, provides a brief review of China's macroeconomic condition.

China's GDP growth rate in a world comparison (see Table 3.2), on the one hand, shows an average of double-digit growth over the last three decades. On the other hand, economic growth between China and the rest of the developing world (the categories of low income and middle income"), has shown great divergence. Under the influence of neoliberalism starting in late 1970s, China is an example of a country that did not suffer

from “lost decades,” as frequently happens across the developing world. In Lo and Li (2011), China’s quick economic development is attributable to continuous industrialization and capital deepening. In most developing economies, there have been periods of deindustrialization, or at least industrial stagnation.

Table 3.1 Macroeconomic Indicators for China (2011)

GDP (current bln CNY)	47310.41
Real GDP % change	9.3
Government Revenue (% of GDP)	21.97
Total Value of Imports & Exports (% of GDP)	49.99
Trade balance (bln USD)	154.9
Gross domestic savings (% of GDP)	52.52
Gross domestic capital formation (% of GDP)	48.45
Foreign direct investment (current bln USD)	116.01
Loans extended by financial institutions (% of GDP)	123.05
Population (mln)	1347.35
Per Capita GDP (CNY)	35198
Exchange rate (average, CNY:USD)	6.4588

Source: China Statistic Yearbook (2013)

Table 3.2 China’s economic growth and international comparison, 1961–2011

Country Name	1961-70	1971-80	1981-90	1991-2000	2001-11
China	**4.65**	**6.28**	**9.35**	**10.45**	**10.38**
Brazil	6.19	8.51	1.65	2.56	3.56
Russia			-3.00	-3.61	4.86
India	4.03	3.08	5.57	5.57	7.41
South Africa	6.00	3.39	1.54	1.84	3.49
Japan	9.30	4.50	4.64	1.14	0.64
United States	4.21	3.27	3.25	3.44	1.58
Germany		2.91	2.34	1.95	1.19
Korea	8.26	7.30	8.74	6.19	4.12
Low income	3.82	2.10	2.77	2.80	5.44
Middle income	5.16	5.34	3.10	3.84	6.05
High income	5.38	3.64	3.29	2.66	1.59
East Asia & Pacific	8.35	4.85	5.17	3.02	3.64
Europe & Central Asia	4.99	3.17	2.44	1.89	1.72
Latin America & Caribbean	5.44	5.64	1.31	3.26	3.43
Sub-Saharan Africa	4.96	3.69	1.86	2.34	4.73
Middle East & North Africa	9.20	8.64	1.81	4.10	4.38
South Asia	4.31	3.05	5.45	5.29	6.91

Source: World Bank (2013)

However, China is still a low-middle income country because of its large population base. Although GDP per capita in China has risen gradually, from less than USD 200 at the beginning of the reforms in 1978, to more than USD 5,000 in 2011 (World Bank, 2013), it only was ranked as number 100 in a world comparison.

There have been structural changes in the Chinese economy; for example, by 2011, the agriculture sector had declined from a share of 28% of the economy to around 10%, while the service sector increased from 24% to 43%. The industrial sector remained the largest sector throughout all the reforming periods, with a share that ranges between 42% and 48%. Measured in absolute terms, the industrial sector expanded more than 12 times since 1980, when the change in price[8] was controlled. When various ownerships in the industrial sector were introduced, non-state industrial enterprises quickly expanded. Before reforms, SOEs dominated the industrial sector with as share of more than 80% of total industrial output, but this has reversed through reforms. By 2011, SOEs accounted for only a quarter of total output (see Table 3.3).

Table 3.3 Share of industrial output by ownership, %

Selected Year	SOEs	non-SOEs
1970	87.61	12.39
1975	81.09	18.91
1980	75.97	24.03
1985	64.86	35.14
1990	54.61	45.39
1995	33.97	66.03
2000	47.34	52.66
2005	33.28	66.72
2010	26.61	73.39
2011	26.18	73.82

Source: Author's calculation. China Statistic Yearbook (various issues).

[8] The change of price here is measured by the Producer's Price Index for Manufactured Products.

The diversification of ownership structure in the corporate sector, especially in the industrial sector, has brought market elements into the economy. More market-determined factor prices, especially more market-determined capital prices, were vital for China's economic achievement. China's financial system — which kept pace with economic reforms — facilitated real sector development. With continuous support from the financial sector, other sectors' economic reforms were also successful.

3.3 Financial sector reform

In China, banks are the financial system (Walter & Howie, 2011, p. 27). By the end of 2010, total assets in the banking sector reached 95,305.3 billion CNY. When compared with total market capitalization (26,540 billion CNY in China's stock market, and 5,050 billion CNY in total assets of all insurance companies), it is fair to say that banking sector dominates financial activities in China. From the perspective of total social financing, banks loans are still the most important channel for enterprises to raise investment funds, accounting for nearly 60% of all sources of funds (see Table 3.4). Given this dominance, this thesis will be mainly focus on bank reform.

While financial sector reform occurred simultaneously as China's economic reform, many observers have pointed out that the lag between financial reform and reforms in other sectors have widened. However, Cousin (2011, p. 10) argued that state leadership has been reluctant to push for deeper reforms in the financial sector because of its unwillingness to lose control of capital flows and resource allocation. This account, however, may be too general. Top leadership changed over time, so the momentum for pushing reform changed over time as well.

Table 3.4 Total Social Financing in China, 2002-2011, RMB billion

	Bank Loans in RMB	**Bank Loans in Foreign Currency**	**Entrusted Loans**	**Trusted Loans**	**Others***	**Total Social Financing**
2002	1847.5	73.1	17.5		30	2011.2
2003	2765.2	228.5	60.1		306.8	3411.3
2004	2267.3	138.1	311.8		85	2862.9
2005	2354.4	141.5	196.1		237.3	3000.8
2006	3152.3	145.9	269.5	82.5	534.6	4269.6
2007	3632.3	386.4	337.1	170.2	1331.8	5966.3
2008	4904.1	194.7	426.2	314.4	991.1	6980.2
2009	9594.2	926.5	678	436.4	2032.3	13910.4
2010	7945.1	485.5	874.8	386.5	4019.5	14019.1
2011	7471.5	571.2	1296.2	203.4	2830.6	12828.6

Source: China Statistics Yearbook (2012). Others include: undiscounted bankers' acceptances, net financing of corporate bonds, and equity financing on the domestic stock market by non-financial enterprises.

As described above, financial reform in China followed a gradual approach. However, years after the establishment of the two-tiered banking system in 1993, China experienced rapid financial liberalization through the establishment of stock markets in Shanghai and Shenzhen, SOB shareholding reforms, and more liberalized interest rates. The Asian financial crisis in 1997 was a turning point, and it warned China of the risks and costs of the potential collapse of its financial system. From that event,, strengthening regulations and supervision of the financial sector became more important. By the end of 20th century, the big four SOBs were recapitalized by the state and their NPLS were redistributed to four newly established Asset management companies. The peak of financial liberalization was the public listing of the four SOBs in both domestic and Hong Kong stock markets, starting in late 2005. After that time, the speed of financial reform suddenly decelerated, which, according to Walter and Howie (2011, p. 15), can explained by the change in CPC leadership at the end of 2006. Supporting, rather than leading, economic development was now favored by the state, in order to maintain economic stability.

Over the course of the reforms, the main concentration, or the policy targets, changed. Given the different themes of the reforms, and to deliver an in-depth assessment, the reforms have been broken into four periods based on several key events and the progress of the reforms. The first phase of reform took place between 1978 and 1983, and the second phase took place between 1983 and 1989. China started with a mono-banking system, but the People's Bank of China (PBOC) was separated from the Ministry of Finance in 1984, and banks in general were established. However, excessive lending due to initial financial reforms caused nationwide financial disorder and high inflation in the late 1980s. After a short cool-down period, financial reform restarted in 1993, one year after Deng Xiaoping's famous southern China tour, which signaled the need to keep reforming. Although the 1984 reform made the PBOC a pure central bank because a two-tiered banking system had been created, it was not until 1994 that improvements were made in institutional and legal environments. In 1994, three development-oriented policy banks were created, and the Central Banking Law and Commercial Banking Law were promulgated by the National People's Congress.

After a readjustment period between 1989 and 1993, this thesis marks 1993 through 2003 as the third phase of reform. During this period, along with additional banking sector reforms and better institutional and legal environments, other efforts included the development of stock markets and loosening capital control. The Asian financial crises in 1997 caused China to decelerate its liberalization of international finance, that is, the opening of capital accounts, and it also caused the state to focus on the stability of its financial system. During the second half of this phase, particularly after 1998, state banks were recapitalized by the state, and a target of public listing (mainly targeting the Hong Kong stock market) were been put on the state's agenda. The stock market was aimed at improving corporate governance and risk management.

The fourth phase started in 2003 and is ongoing. This phase is focused on issues of regulation and supervision, especially after the world financial crises that started in 2007. This thesis takes the position that for foreseeable future, improving financial regulations and supervision will remain the focus of the reforms.

3.3.1 Financial system before the reform

Before 1978, there was no financial system in China. Although some individual banking institutions did exist, such as the PBOC, the Bank of China (BOC), and the China Construction Bank (CCB; named the People's Construction Bank of China at that time), these banking institutions were not the kind of banks expected today. They did not mobilize savings, process information, or facilitate investment. Their mission, instead, was to fulfill national economic development plans, such as the five-year plans devised by the CPC. As capital flows, for the most part, were regulated by these plans, banks were simply the cashiers for the government (Xu, 1998, p. 14), at both central and local levels. As a result, the PBOC, under the Ministry of Finance, was both the central bank and a commercial bank, which is expected in a typical mono-banking system. Furthermore, the BOC, which was involved with international financial services, was under the PBOC, though very few services were provided. The CCB was actually the Capital Construction Investment Division, under the Ministry of Finance. In other words, it was the same unit with two different names, which is a distinctive Chinese institutional arrangement.

The banking system operated the following way. The National Development and Reform Commission (formerly the State Planning Commission) wrote the draft for the following year’s financial plan, which listed every financial transaction for the purpose

of facilitating long-term investment projects. This draft was then sent to the Ministry of Finance for approval. Once the annual plan was approved, as the cashiers of the Ministry of Finance, the banks accepted savings from households and SOEs, and provided funds and working capital to particular sectors and for particular projects according to the financial plan. The only bank operations not predetermined in the yearly plan was short-term loans.

The functions of financial intermediation were limited, as were the functions of issuing currency and adjusting macroeconomic environments; there were not considered as business areas of the PBOC or other banking institutions. There were no other kinds of financial institutions and no financial markets, which left plenty of space for future reform.

The weaknesses of the system before 1978 are obvious. First, savings were not mobilized to generate more loanable, investment funds, but for absorbing excess money in the economic circulation (Xu, 1988, p. 14). This means there were no incentives for banks to improve their efficiency in pooling savings and transforming savings to investment. Second, as long-term loans and working capital was not determined by market entities, the efficacy of the funds utilization was usually low and not guaranteed. Effective regulations and supervision was also nonexistent. Third, long-term loans for project investment were predetermined by the plans. The dearth of effective instruments on the market, for example, interest rates, made it hard to determine the accurate amount needed for future investment, which weakened the effectiveness of future plans.

The domination of state and collective ownership in the corporate sector during the central planning years largely effaced the entrepreneurship of firms in Keynesian–

Schumpeterian terms. There was no room for banks to have an effect on economic development. Financial reforms, aimed at providing more effective resource allocation, only occurred after economic reform had taken place.

3.3.2 The first phase of reform: 1978 to 1983

Moving form a centrally planned economy to an economy with market attributes, the primary objective of financial reform was to change the financial mechanisms of resource allocation, that is, switch the plan determined/budget determined model to a market determined one. This raised the demand for real financial intermediations — conventional banks and a real financial system. As a result, the share of the state budget in financing capital investment in SOEs declined dramatically, from more 80% in 1978 to less than 40% in 1985 (see Table 3.5).

Table 3.5 Investment in Fixed assets in State-owned Enterprises, 1960-1985

Year	Total investment (Bln Yuan)	Capital Construction Investment (Bln Yuan)	Financed by state budget (%)
1960	41.66	38.87	77.63
1965	21.69	17.96	90.80
1970	36.81	31.26	87.26
1975	54.49	40.93	81.98
1978	66.87	50.10	83.31
1979	69.94	52.35	79.96
1980	74.59	55.89	62.49
1981	66.75	44.29	56.80
1982	84.53	56.55	48.92
1983	95.20	59.41	58.20
1984	118.52	74.32	54.36
1985	168.05	107.44	39.23

Source: China Statistic Yearbook (1986)

Several decisions were made by the central government in 1979. In January, the People's Bank of China was separated from the Ministry of Finance. However, despite

this independent status, the PBOC continued to be both the central bank and a commercial bank until 1984. In this first phase, the PBOC was both a regulatory body and market player in the Chinese financial system until the formal introduction of a two-tiered banking system in 1984. At that point, the PBOC acted as only the central bank.

In February, the Agriculture Bank of China (ABC) was established as an independent bank; prior to this point, it had been under the Rural and Agriculture Financing Department within the PBOC. The purpose of this change was to better promote rural development, especially in providing better financial services for Township and Village Enterprises (TVEs) and supervising Rural Credit Co-operatives (RCCs). In March, independent status was also given to the BOC, and its specialization in international trade and foreign-related businesses was retained. Meanwhile, one of the BOC's activities, foreign currency administration, was shifted to a newly formed regulatory body, the State Administration of Foreign Exchange. The BOC remained the only bank that served as an import–export bank, responsible for all exchange-related transactions, until 1985, when other banks were permitted to take part in foreign-related businesses. The CCB was made nominally independent in August 1979, though it was still managed by the Ministry of Finance. However, its function of allocating funds to facilitate SOEs' capital construction changed gradually from distributing interest-free state money to extending commercial bank loans. It was until September 1983 that the CCB became a fully independent bank.

To conclude, the first phase of financial reform witnessed the establishment of real banks in China (see Table 3.6). To accommodate reforms in the corporate sector, the role of financial intermediation was highlighted because of the change in the financial

mechanism: from state budget to loans. The experience gained in banking autonomy in this phase of reform laid the foundation for future reforms, including the establishment of the two-tiered banking system, and new kinds of banking and nonbanking financial institutions with various ownership structures. It is worth noting that in this phase of reform, nonbanking financial institutions, such as RCCs and Trust and Investment Corporations (TICs), were established and entered market competition, providing alternative financing channels to real banks.

Table 3.6 Timetable of forming new banking institutions

Institution	Date	Events
People's Bank of China	Jan. 79	Separated from MOF
	Jan. 84	Detached all commercial businesses; became only central bank, responsible for financial regulations
	Aug. 97	Securities regulation duties moved to China Securities Regulatory commission
	Sep. 98	Abolished all provincial branches; restructured into 9 regional branches; not administratively related to provincial governments
	Nov. 98	Insurance regulation duties moved to China Insurance Regulatory Commission
	Apr. 03	Banking sector regulation duties moved to China Banking Regulatory Commission; becomes purely monetary agency
Bank of China	Apr. 79	Separated from PBOC; still responsible for foreign exchange-related businesses
	Apr. 94	Specialized bank for foreign-related businesses; no longer responsible for foreign exchange administration
Agriculture Bank of China	Feb. 79	Separated from PBOC
China Construction Bank	Aug. 79	Nominally separated from MOF; specialized to finance SOEs' capital construction projects
	Sep. 83	No longer administrated by MOF; becomes independent bank
	Mar. 96	Switching to its current name
Industrial and Commercial Bank of China	Jan. 84	Separated from PBOC; becomes final state-owned bank

Source: PBOC, BOC, ABC, CCB and ICBC. MOF: Ministry of Finance; PBOC: People's Bank of China.

3.3.3 The second phase of reform: 1983 to 1989

Regaining its position back into the World Bank in the mid-1980s was not only a political victory for China; it also implied China's determination in liberalizing and reforming its financial sector to follow in the steps of other advanced economies. On January 1, 1984, the PBOC was no longer responsible for commercial banking, as those duties were moved to the newly formed Industrial and Commercial Bank of China (ICBC), and the PBOC officially became only a central bank. With a two-tiered banking system framework, at the top tier was the PBOC, which functioned as the monetary agency and which was responsible for both monetary policies and currency stability. At the second tier were the SOBs, the ABC, the BOC, the CCB, and the ICBC. In addition to preserving their own characteristics, these banks also performed as financial intermediaries to provide financial services such as mobilizing savings and facilitating investment. In addition, before the creation of an independent banking regulatory body, the PBOC acted as both the regulatory authority and the Lender of Last resort for the SOBs: it acted as both the banker to the government and the bank of banks.

By changing its role to a monetary and regulatory body, the share of PBOC's total assets in the financial system dropped from more than 90% before reforms to nearly 25 percent in 1986 (Xu, 1998, p. 21). In its new role, the PBOC used direct and indirect tools to regulate banks. A credit plan, which determined the amount of money a bank could borrow, was published by PBOC on an annual basis. Before the employment of more prudential, asset-liability-based management instruments in 1998, these credit plans allowed the PBOC to control the scale of total social financing. Reserve requirements and short-term liquidity to specialized banks were put in place by the PBOC; and interest rates, though kept artificially low to support industrial SOEs, were

also used as a banking management tool by the PBOC.

Between 1985 and 1987, Joint-Stock Commercial Banks (JSCBs) — such as the Bank of Communication (BOCOM), the China International Trust and Investment Corporation Bank (CITIC), and China Merchants Bank (CMB) — were approved to enter the banking industry to promote competition in the financial sector. In addition, several regional banks, including the Guangdong Development Bank (now known as China Guangfa Bank) and the Shenzhen Development Bank, and the Yantai Housing Savings Bank and Bengbu Housing Savings Bank were permitted to be establish by the PBOC in the second half of the 1980s. Apart from generating a third tier of banking, competition among the SOBs was strengthened by allowing overlapping business areas. The other SOBs were gradually allowed to operate foreign exchange-related businesses, traditionally assumed to be the exclusive area of the BOC. Meanwhile, the ABC was allowed to open branches in urban areas, and was no longer restricted to the agriculture and rural sectors.

For nonbanking financial institutions, collective-owned Urban Credit Co-operatives (UCCs) grew rapidly in the second half of the 1980s, and filled the market not covered by large commercial banks. They extended short-term loans, especially to individuals and small private enterprises. In the late 1990s, the UCCs were transformed into City Commercial Banks (CCBs).

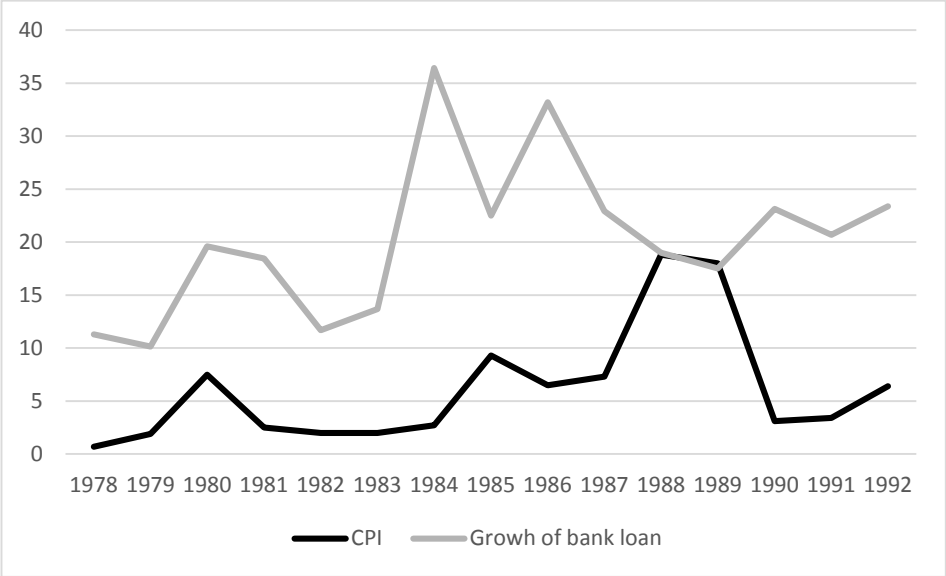
The second phase of financial reform continued the direction set in the first phase. By the end of 1988, there were 20 banking institutions and 745 TICs across China. Given the adoption the two-tiered banking framework, real competition among banks emerged, though it was limited. With the explosive growth in household savings between 1983

and 1989, a rapid expansion in financial institutions was recorded. Not only did the number of institutions expand, but so did the asset levels and scale of credit provided by banks. However, the combination of expansionary growth of cheap banking credit and artificially repressed interest rates resulted in serious problems over the next several years. These problems included nationwide high inflation and social instability. A cool-down and adjustment period became necessary, and it was not until 1993 that financial reform was restarted.

3.3.4 Adjustment period: 1989 to 1993

The excessive provision of bank loans, with an average annual growth rate higher than 30% between 1984 and 1986 certainly exacerbated the overheating of the entire economy in the second half of the 1980s (see Figure 3.1). The credit boom was largely due to the state's relaxation of credit ceilings. Starting in the mid-1980s, banks were allowed to extend more credit if they also collected more savings. The major side effect of this boom was an unexpected high inflation rate. The inflation rate, if measured by Consumer Pricing Index (CPI), suddenly rose to nearly 20% in 1988 and 1989 in the wave of this boom (see Figure 3.1**)**. Furthermore, as mentioned above, the central government was planning to adopt a shock therapy for future price reforms, though this plan was never set into motion. The combination of these factors caused serious problems, including social instability and financial disorder.

Figure 3.1 CPI and bank loan growth rate, 1978–1992, %



Source: Author's calculation. National Bureau of Statistics of China (2009); Almanac of China's Finance and Banking (various issues); China Statistic Yearbook (various issues). There is no composite CPI before 1985; pre-1985 data is the CPI in urban areas.

During the cool-down period, no policies on future financial reform were made; and the PBOC made several efforts to return financial activities to their normal developmental paths. The tool the PBOC employed was a tighter credit ceiling, mainly through tightening credit plans. The new ceilings not only put restrictions on bank loans to SOEs, but also on loans to TVEs. The ceilings had a two-level structure. On the first level, the PBOC regulated credit ceilings on a bank-by-bank basis; on the second level, banks themselves deployed ceilings to their local branches. In order to monitor the enforcement of ceilings, starting in 1989, which was the second year with an inflation rate above 18%, the PBOC requested formal quarterly reports on the implementation of ceilings.

Other efforts were made to put the economy back on its developmental path, such as raising interest rates and official reserve requirements, and strictly controlling the number of central bank credits to commercial banks. In order to protect deposits and to keep the interest rate positive, a long-term RMB Value Protected Savings Deposit Plan

(World Bank, 1990, p. 54) was introduced by the PBOC in the third quarter of 1988.

The results of the direct and indirect controls on the financial sector were obvious in that the inflation rate been dropped to no more than 5% in 1990, and remained moderately low over the next few years. As Walter and Howie (2011, p. 37) observed, it was not until Deng Xiaoping's talks in south China in 1992 that financial reform started again.

3.3.5 The third phase of reform: 1994 to 2003

The credit plans and credits ceilings designed by the PBOC highlight the strong state interventions in bank lending. It also shows the dominant role of direct credit in bank lending, and that loans were not extended on a pure commercial basis. The SOBs were still responsible for providing working capital to the SOEs, and the development objective was financing investment projects; therefore interest rates were kept artificially low when compared with the opportunity cost of returns on investment. The lag between cheap credits and relatively high investment returns not only created room for investment expansion, but it also created opportunities for the expansion of speculative investment activities, such as investment in real properties. One extreme example of such speculative activities was the collapsed Hainan real estate bubble in the late 1980s, which led to more than 30 credit co-operatives in the Hainan province to shut down, leading to the bankruptcy of the Hainan Development Bank in 1998.

Given this background, and with the signal of deepening reforms during Deng's tour to the southern part of China, financial sector reforms were focused on additional liberalization, or more accurately commercialization, of the SOBs. Reforms such as

separating developmental banking from commercial banking were approved in December 1994 at the Third Plenary Session of the Fourteenth CPC Central Committee, in a document titled “Decision of the State Council on Reform of the Financial System.” The reform established independent policy banks; and so the China Development Bank (CDB), the Agricultural Development Bank of China, and the Export–Import Bank of China were formed in following year. With the establishment of these three policy banks, the four SOBs were no longer involved in developmental lending. However, this does not imply that SOB lending was becoming purely market-determined. For example, extending loans to unprofitable SOEs may have been done with the purpose of maintaining social stability: financially supported enterprises could continue to pay wages to their workers. It was hard to distinguish whether it is the willingness of banks to do so or not. One explanation provided by Ma (1996, p. 168) is that until the 1990s, local governments retained a strong influence on banks’ local branches. This was accomplished through the head officers of provincial branches, including those of the PBOC and SOBs: these officers were appointed by the provincial governments, not by the headquarter offices of each bank. Therefore, because local governments always had economic development as their primary objective, the SOBs worked as both development banks and commercial banks, as kind of quasi-fiscal agencies (Laurenceson & Chai, 2003, p. 60). This dual role continued until 1998.

Formal institutionalization of the financial sector also occurred during this phase. The promulgation of the Commercial Banking Law and Central Banking Law in 1995 legally fixed the PBOC’s role as a central bank and formally appointed it as the regulator and supervisor of both banking and nonbanking financial institutions. (These duties continued until a new regulatory body, the China Banking Regulatory Commission (CBRC) was established in 2003.) Article 39 of the Commercial Banking

Law covered the changing methods of bank lending regulations, from the previous credit plan model to a more assets-liability-based one. Four points were raised in article 39: (a) the capital adequacy of commercial banks shall not be lower than 8%; (b) the outstanding loans to deposits rate shall not exceed 75%; (c) the ratio of the outstanding balance of liquid assets to that of liquid liabilities shall not fall short of 25%; and (d) the ratio of the outstanding loans to one borrower to that of the capital of the bank shall not exceed 10%. Bank control began to rely less on direct methods, and moved to a regulatory framework in accordance with common international practices, that is, the Basel Banking Supervision Accords. Consequently, credit plans, usually drafted by the PBOC, were eventually abolished in 1998, though a guiding plan on bank credit allocation still exists.

Building a more competitive banking environment also deepened banking reform. Following the same strategy that created tiers in the banking industry during the second phase, starting in 1992, foreign banks were permitted to open branches in large cities. In 1995, just three years later, there were more than 15 branches and 25 representative offices from different foreign banks operating in China, though mostly in the coastal areas. However, there were a wave of foreign branch closings after the Asian financial crisis in 1997. It was not until 2001, when China became a member of the WTO that foreign banks returned. By the end of 2011, after what was known as the “golden decade” (Luo, 2011) for the development of foreign banking in China, there were more than 180 foreign banking institutions across China, from 45 countries and regions (CBRC, 2012).

Starting in 1995, banking competition was increased when the former UCCs became CCBs; and it rose again in 1996 with the approval to establish private banks. China

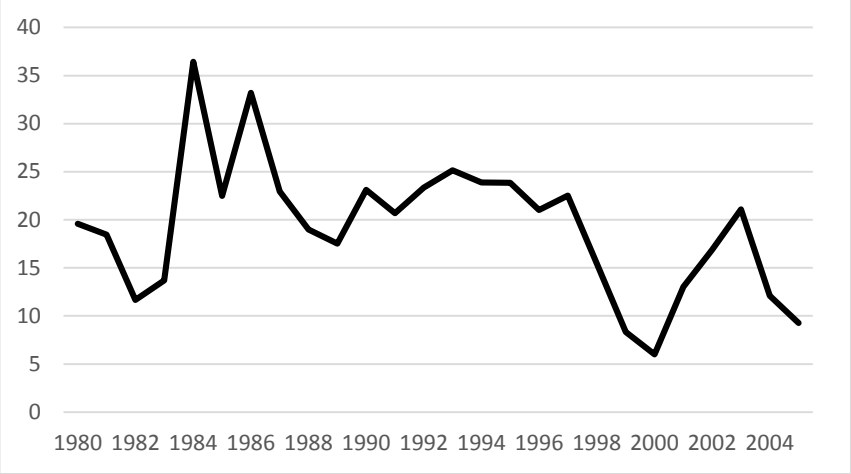
Minsheng Bank became the first private bank established in China whose principal shareholders were mainly non-state related enterprises. Although the market share of CCBs and private banks was relatively small, a fourth tier of banking system was created. As a reminder, the two-tier system included the PBOC and SOBs; the three-tier added JSCBs, and now the fourth tier included medium-sized and small-sized banking institutions.

Along with banking reforms, financial markets, especially the stock market, also grew rapidly during this third phase. During the early stage of stock market development, firms that publicly listed on the market were mainly SOEs. Though public listing was expected to generate positive impacts on improving SOEs' corporate governance, the scale and ability of channeling investment funds was limited when compared with the banking sector. A radical position was held by the economist Wu Jinglian (2001): without establishing clear ownership and improving the governance structure of already listed firms, the Chinese stock market simply became a casino. This position, which was popular in the early 2000s, questioned the effectiveness of channeling investment funds and promoting firms' productivity growth through the stock exchange in China.

By the end of the 1990s, especially after the Asian financial crises in 1997, serious problems of the banking system were exposed once again; this time, however, the problem were NPLs. Although around 1985 the growth of bank credit dropped a bit following credit expansion, during the 1990s until 1997, the growth of bank loans was never below a rate of 20% per year (see Figure 3.2). What important to note is that a large portion of the bank loans were to support unprofitable and insolvent SOEs. As mentioned earlier, SOBs were still active quasi-fiscal agencies of the state. In discussing the composition of NPLs, Zhou Xiaochuan (2004), the governor of the PBOC, indicated

that 20% of the NPLs were due to inappropriate internal management, and the remaining NPLs were mainly due to state planning, defaults by SOEs, and local government interventions.

Figure 3.2 Bank loans growth rate, 1980-2005, %



Source: Author's calculation. Almanac of China's Finance and Banking (various issues); China Statistic Yearbook (various issues)

For the stock of NPLs of SOBs between 1997 and 2000, the estimates from outside observers vary wildly (see Anderson, 2006; Lardy, 1998, 2000, 2001; Studwell, 2003), but according to studies conducted at the end of 20th century, the average NPL ratio of SOBs was no less than 25%, with an extreme estimation of more than 50% made by Anderson (2005). The official data of NPLs at that time, however, does not reflect the real situation, because prior to 2002, the state was employing an internationally incompatible four-tier classification standard. After 2002, an internationally accepted five-tier NPL classification standard was used by China's financial institutions. After re-estimating the historical data using the five-tier NPL classification standard, the president of ICBC, Jiang Jianqing (2005) stated that, in 1998, the NPLs of the ICBC, the largest SOB, were higher than 47.5%, and nearly 80% of bad assets related to lending to SOEs. To some observers, by the end of 20th century, the SOBs that dominated the Chinese banking system were technically bankrupt (Laurenceson & Chai,

2003, p. 59).

During the second half of this phase of reform, the objective switched to resolve the serious problem of NPLs. In spite of deepening reforms in the corporate sector by closing unprofitable and insolvent SOEs, the solution of dealing with NPLs, or more fundamental, the poor corporate governance and risk management of SOBs, consisted of several gradual steps. The first step was to recentralize banks so as to end the interventions from local governments on banks (Yang, 2004, p. 131). In 1998, the PBOC was restructured when its provincial branches across the nation were closed, and nine new regional branches were established. This action meant that provincial governments could no longer intervene, because they could no longer appoint the head officers of local branches of the PBOC. The vertical management restructuring has also been applied to the four SOBs. The benefits of recentralization were obvious: the objectives of economic reform from the central level could be implemented at the local level more effectively. Insolvent local SOEs were no longer granted bank credit and lending behaviors of SOBs were no longer manipulated by local governments.

A second step, which was more straightforward, was to write off the NPLs and recapitalize the SOBs. To write off bad loans and clean up balance sheets, four asset management companies (AMCs), which each served one of the four SOBs,[9] were established by the central government in 1999 to buy NPLs from the SOBs and three policy banks. At this first wave of write-offs, a total amount of nearly 1,400 billion CNY NPLs from the SOBs were sold to AMCs (see Table 3.7). The major source of funding for the AMCs was relending from the central bank, in the amount of more than

[9] The four AMCs are China Great Wall Asset Management Corporation for ABC; China Orient Asset Management Corporation for BOC; China Cinda Asset Management Corporation for CCB; and China Huarong Asset Management Corporation for ICBC.

600 billion CNY. However, this was only the beginning of the story. Along with other waves of NPL write-offs after 2004, the AMCs were also absorbing problem assets from SOBs and the policy banks. It was not until the third National Financial Work Conference in 2007 that the AMCs first announced they completed their mission of disposing of the SOBs' NPLs (Jia, 2007). According to Cousin (2011, p. 162), the total volume of NPLs written off to AMCs exceeded 2,000 billion CNY.

Table 3.7 Four major waves of NPLs written-off from SOBs

Date	**Sources**	**Amounts, billion CNY**
1999-2000	SOBs and CDB	1393.9
2004	BOC, CCB, BOCOM	278.7
2005	ICBC	635.0
2008	ABC	815.6
	Total	3123.2

Source: Almanac of China's Finance and Banking (various issues)

In order to raise the capital adequacy of the SOBs to meet the minimum requirement of 8% with reference to Basel I, between 1998 and 2005, the central government recapitalized the SOBs several times, with a total amount of 270 billion CNY in the form of issuing government bonds and injecting foreign exchange reserves (Cousin, 2011, p. 280). In 2008, when the NPL ratio reached more than 35%, China Everbright Bank, usually labeled as a JSCB, was recapitalized by the central government through China Central Huijin, a state-owned investment company. Such banking sector recapitalization came at a cost, including the threat of fiscal unsustainability. Woo (2003, p. 390) commented that given the relatively low fiscal revenue but equally high government debt ratio of China, in comparison with OECD economies, rounds of recapitalization by the financial sector could raise the government debt to GDP ratio of China, resulting in an unaffordable economic crisis.

The write-off of NPLs and the injection of quality capital into the SOBs, starting in

1998, also served as the foundation to promote the third pillar of the SOBs' corporate governance and risk management: public listing. By tightening the audit standard, opening financial information to the public, and imposing monitoring pressure from outside investors, public listing not only improved corporate governance but also helped with straightening out the ownership structure of SOBs, as share-holding reform was an essential step for an initial public offering (IPO). Because of the immaturity of China's stock market, the Hong Kong stock exchange was considered ideal for the IPOs of SOBs. The CCB was the first SOB to land on Hong Kong's stock market, while the BOC was the first on Shanghai's stock market (see Table 3.8). Although the ABC was the last SOB to complete public listing reform, by the end of 2012, the ABC and the ICBC were the world's two largest IPOs, raising USD 19.228 billion and USD 19.092 billion, respectively (Renaissance Capital, 2014).

Table 3.8 Public listing date of SOBs

Activity	CCB	BOC	ICBC	ABC
Completion of share-holding reform*	Sept. 21, 2004	Aug. 26, 2004	Oct. 28, 2005	Jan. 6, 2009
Hong Kong stock market IPO	Oct. 27, 2005	June 1, 2006	Oct. 27, 2006	July 16, 2010
Shanghai stock market IPO	Sept. 25, 2007	July 7, 2006	Oct. 27, 2006	July 15, 2010

Note: Data compiled from the Shanghai Stock Exchange, http://www.sse.com.cn and the Hong Kong Stock Exchange, http://www.hkex.com.hk. * Completion refers to the date of establishing share-holding firms.

In addition, through public listing and share-holding reforms, the SOBs were able to meet strategic oversea investors, for the purpose of learning about and improving internal management. In 2005, Bank of America was invited to acquire a stake of 9% in the CCB; later Goldman Sachs and American Express were invited to buy stakes in the ICBC, and Royal Bank of Scotland and Temasek to buy stakes in the BOC.

In summary, the third phase of financial reform started with liberalization and commercialization, and both institutional and legal environments were strengthened. Policy lending and government interventions in the SOBs were restricted and then eliminated. In the second half of this phase of reform, despite dealing with insolvency and NPL issues, through public listings and meeting strategic oversea investors, "internationalization" of the banking system began. What is worth noting is that the PBOC continued to served multiple roles, including as monetary agency, the leader and governor of SOBs, and regulatory body of financial institutions. To a certain extent, the PBOC started to supervise itself. Therefore, the fourth phase of reform is to restructure and redesign the regulation frameworks accordingly.

3.3.6 Current phase of reform: 2003 through the present

The serious problem of NPLs at the end of the 20th century certainly reminded the state that a collapse of the financial system would be extremely expensive. Given the multiple roles of the PBOC, financial reform in this period started with forming new regulatory bodies, so as to diversify the responsibilities of the PBOC. In 2003, the PBOC's regulation department was appointed by the central government to form the China Banking Regulatory Commission (CBRC). The CBRC, as well as the China Insurance Regulatory Commission (CIRC) and China Securities Regulatory Commission (CSRC) were authorized by the state council and given the same ministerial level as the PBOC. Since then, the term *Yi Hang San Hui* (one (central) bank and three commissions) has been used to describe the institutional settings of China's financial regulation framework. Though the PBOC is the monetary agency responsible for macroeconomic and financial stability and is the Lender of Last Resort for Chinese

banks (Cousin, 2011), parts of its regulatory role was passed to the CBRC.

To further strengthen the legal environment, the Commercial Banking Law was revised in 2003; and a new law, the Banking Supervision and Administration Law, promulgated in 2003, was revised in 2006. The latter law cleared the legal status of both the CBRC and PBOC as regulators of the banking industry.

The establishment of the CBRC allowed for a more assets-liability-based, prudential regulatory framework. Although the Commercial Banking Law of 1994 first introduced capital adequacy to the banking sector, it was *Regulation Governing Capital Adequacy of Commercial Banks*, an article published by the CBRC in early 2004, that provided details on particular indicators and targets that banks need to comply with (CBRC, 2004). According to Cousin (2012, p. 3), the CBRC article, though mainly based one Basel I, also included some spirit from Basel II. The reform and development of banking regulations started to follow the steps in the Basel Accords. On January 1, 2013, a modified version of Basel III was put into practice by the CBRC and state council. For a detailed implementation progress of the Basel regulatory framework in China, see Basel Committee on Banking Supervision (2013, p. 37) (see Table 3.9)

3.4 Summary

This chapter presented a comprehensive picture of China's financial reforms by providing the background of overall economic reforms, starting in the late 1970s. During China's economic transformations, reforms in different sectors have followed the principle of gradualism, including the financial sector. Given its dominant role in financial activities in China, the focus of this chapter's analysis has been on the banking

sector reforms. Furthermore, regarding the different reform targets pursued by the government throughout the stages of reform, this analysis in broke the overall financial reform process into four phases, according to the order and progress of each reform. Features of each phase of reform have been assessed.

Reform of the financial sector has been taken place for more than 30 years. During this time, themes of “liberalization,” “commercialization,” and “internationalization” dominated the reform path, and these targets have been largely achieved: diversified financial institutions have been set up; market competition has been enhanced; and international experience and standards on corporate governance, operations, and regulations have been introduced. Today it is fair to say that China has a modern financial system, according to commercial criteria.

However, it is still too early to know whether the direction or the speed of the reform would be retained or not. First, China’s financial reforms are largely affected by China’s macroeconomic condition and reforms in the corporate sector. The reform path of the financial sector in China suffered several serious problems, which were in stride with the “boom–bust” or “stop–go” cycles of the macroeconomy (Brandt & Zhu, 2007, p. 94; Lo et al., 2011, p. 277): the loss of control of the credit supply and high inflation in late 1980s, and the problems of NPLs in late 1990s. Such problems also caused “stop–go” cycles within financial sector reform: a set of concentrated reforms was followed by a period of adjustment and adaptation. In this respect, China’s financial reforms accommodated, rather than lead, the overall economic transformation. Second, the transformation from a quantitative-based financial development path to a qualitative-based one may involve high cost and efficiency losses in the short-run. This, however, can be seen as a vital challenge for further financial reform in China.

Table 3.9 Implementation progress of the Basel regulatory framework in China (through the end of July 2013)

Basel III Regulation	Date of issuance by Basel Committee on Banking Supervision	Transposed into Chinese rule	Date of issuance in China	Status
Basel II				
Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework - Comprehensive Version	June 2006	The Capital Rules	June 2012	Completed and rule in force
Basel 2.5				
Enhancements to the Basel Framework	July 2009	The Capital Rules	June 2012	Completed and rule in force
Guidelines for computing capital for incremental risk in the trading book	July 2009	The Capital Rules	June 2012	Completed and rule in force
Revisions to the Basel II market risk framework	July 2009	The Capital Rules	June 2012	Completed and rule in force
Basel III				
Basel III: global regulatory framework for more resilient banks and banking systems - revised version	June 2011 (consolidated version)	The Capital Rules	June 2012	Completed and rule in force
Pillar 3 disclosure requirements	July 2011	The Capital Rules	June 2012	Completed and rule in force

for remuneration		Guidance on Sound Remuneration of Commercial Banks		
Treatment of trade finance under the Basel capital framework	October 2011	The Capital Rules	June 2012	Completed and rule in force
Composition of capital disclosure requirements	June 2012	Notice on Enhancing Disclosure Requirements for Composition of Capital	July 2013	Completed and rule in force
Capital requirements for bank exposures to central counterparties	July 2012	Notice on Measurement Rules of Capital Requirements for Bank Exposures to Central Counterparties	July 2013	Completed and rule in force
Regulatory treatment of valuation adjustments to derivative liabilities	July 2012	Notice on Policy Clarification of the Capital Rules	July 2013	Completed and rule in force

Source: Basel Committee on Banking Supervision (2013, p. 37, Table 3)

Chapter 4

Defining financial development in China: Monetization and financial liberalization

4.1 Introduction

Before assessing how the mechanisms of China's financial system affected economic development, four general concepts of the term financial development need to be explained. The four concepts, which assess financial development from four different and contrasting perspective will be examined within the Chinese context in order.

The first is that the development of a financial system is related to its scale expansion; in other words, the larger a financial sector, the more efficient its financial system. Quantitative development inevitably increases sophistication of the financial system, which in turn can provide higher-quality financial services.

The second concept is financial liberalization. Financial liberalization is regarded as the fundamental basis for financial sector reform in many developing economies. The concept was becoming popular especially in 1970s when the wave of neoliberal economic reforms in Latin American's developing countries occurred. In China, it became the dominant concept in assessing the finance–growth nexus. To certain extent, financial liberalization is understood as the same as financial development. In line with the Washington Consensus of 1989, the argument and policy implications of financial liberalization is straightforward: a less regulated but competitive market-oriented

financial system may be a key determinant in sustaining long-term economic development in developing countries.

The third concept, which takes the position of the functional view of finance (see Chapter 2), emphasizes and defines the development of finance as an improvement in allocative efficiency; in other words, the efficacy of allocating financial resources into investment projects with higher returns. According to this definition, it is not the scale and marketization level of a financial system that affects contributions to real sector development, but the efficiency of the system. Supported by theoretical models from the mainstream endogenous growth theory (see Chapter 2), this view of financial development focuses on the degree that a financial system can overcome market frictions and market failures, such as easing transaction costs and informational asymmetries, during financial activities.

In contrast to the mainstream allocative efficiency view of financial development, the fourth concept of financial development is based on productive efficiency from the Schumpeterian–Keynesian's idea of endogenous credits. The causal direction between savings and investment is the opposite of the allocative efficiency view. For productive efficiency, it is assumed that economic development is delivered through an expansion of financial resources. The focal point of financial development here is switched from the financial system itself to the dynamic interaction between financial investment and real sector development. That is to say, financial development is not defined by how well market frictions are reduced or erased, but by how well available financial resources are produced.

4.2 Financial development: monetization and institution expansion

One way to understand the level of monetization in an economy is to investigate the effects of financial assets and financial services within economic activities. If increased savings and investment are mobilized and facilitated through financial intermediations, there should also be increased financial assets, which implies a degree of financial development. According to this definition, monetization can be monitored by two actions: financial deepening and financial broadening (Naughton, 2007, p. 450). Financial deepening is defined as the ratio of financial assets to GDP, and it has been popularly used as the proxy for financial development in various empirical studies on the intersection of finance and growth, starting with Goldsmith (1969). For many studies, financial deepening is the only variable used to estimate financial development. Starting with King and Levine (1993a), the ratio of liquid liabilities to GDP (M3/GDP) became the standard variable and a widely accepted measurement of financial deepening. The use of M3, rather than M2 (i.e., money versus quasi-money), is because M3 not only includes M2 but also securities issued by financial institutions and deposits in nonbanking financial institutions. This can reflect a more accurate level of monetization. However, at the same time, such indicators can only reflect the amount of financial assets involved in economic activities, not dynamic changes. While financial deepening offers a partial picture of financial development, it is not appropriate to use this as an indicator to make assumptions about the entire performance of a financial system, especially to assess how well it channels funds into investment with higher returns.

Financial broadening is a term used to describe a financial system, from diversification

of financial intermediations to financial services. There are two levels of diversification. The first concerns the quantity, or the total number, of financial institutions, and assumes that a greater number of financial institutions means greater accessibility of financial services by the public. The second level looks at the variety of financial institutions, especially nonbanking financial institutions, such as insurance companies and mutual fund companies. A variety of financial institutions imply the creation of financial instruments and financial services, and that financial innovation makes a financial system more sophisticated, as compared to only a bank-based financial system. Both levels affect the efficacy of a financial system, because an increase in the number of institutions increases competition and provides more choices for customers.

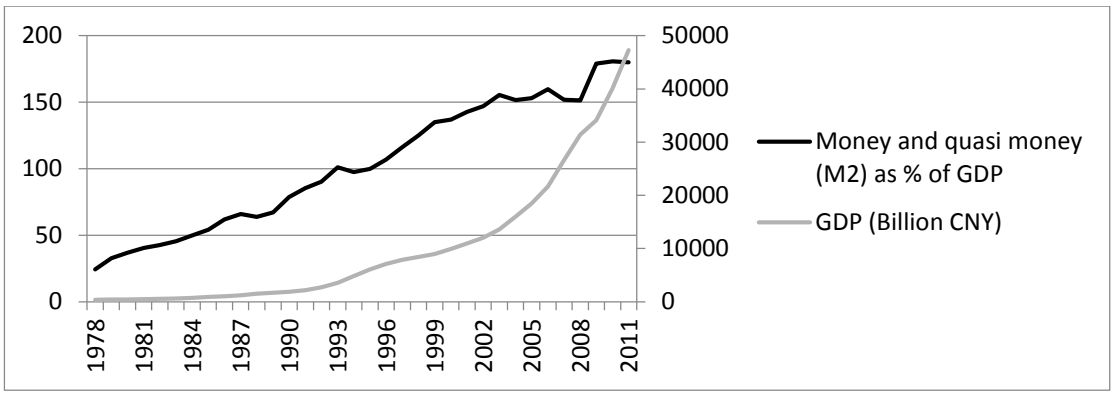
4.2.1 Financial deepening

There is no official M3 data for China because of a lack of state information, as discussed earlier in this thesis. There is data on the M2/GDP ratio, which has grown substantially from 25% at the beginning of the reforms in the late 1970s to more than 180% by the end of year 2011 (see Figure 4.1). China's real GDP increased nearly six times between 1978 and 2010; therefore, the change in the M2/GDP ratio implies an even faster process of monetization. From an international perspective, comparing China to the other four emerging economies (BRIC without the C)[10] and three representative advanced economies,[11] China's M2/GDP ratio is among the highest worldwide (see Table 4.1). India and Korea had a similar M2/GDP ratio as China's in 1980, but starting in the 1990s, China's ratio was double that of these two countries. For the three advanced economies, the U.S. ratio is relatively low, which could be related to

[10] The BRIC countries are Brazil, Russia, India, South Africa, and China.
[11] Germany, Japan, and the United States.

the fact that the United States has a market-based financial system and a large number of financial activities are by nonbanking financial institutions, which cannot be reflected in M2.

Figure 4.1 M2/GDP Ratio and GDP of China



Source: World Bank (2013).

Table 4.1 M2/GDP International Comparison, %

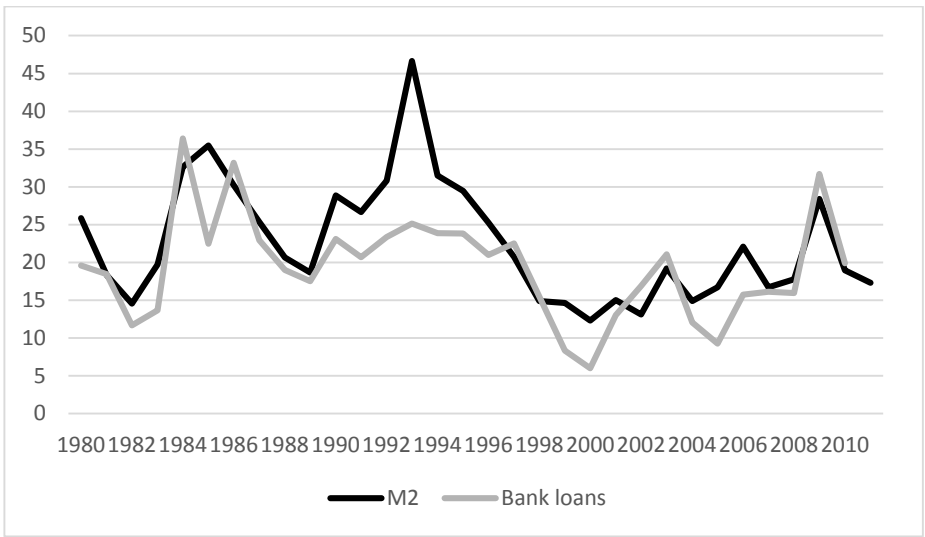
Country Name	1980	1990	2000	2005	2010
China	36.76	78.65	137.04	153.03	180.78
Brazil	11.89	30.39	47.26	54.58	68.84
Russian	---	---	21.54	33.38	52.67
India	33.87	41.46	53.92	64.46	77.28
South Africa	53.67	53.80	54.09	69.88	78.27
Korea	32.33	36.80	68.47	65.51	75.62
Japan	142.18	187.36	240.56	206.85	226.64
United States	71.76	73.85	70.95	74.91	83.53
Germany	---	---	169.58	182.18	185.54

Source: World Bank (2013).

The relative high degree of the M2/GDP ratio in China may also indicate the presence of financial repression (Riedel, Jin, & Gao, 2007). This interpretation, first raised by Boyreau-Debray (2003), argues that a high ratio could be interpreted as a result of limited access to alternative non-monetary savings instruments in the household sector. More importantly, it may also be a result from pressure to accumulate savings deposits for investment, because of limited access to formal bank credits in the corporate sector.

This thesis argues that the deepening process of money is largely in the form of issuing bank credits. Over the past nearly 30 years, the growth rate of bank loans has matched the money and quasi-money supply (see Figure 4.2). In periods of loan expansion, such as during the first boom of bank credits between 1984 and 1986, and when financial reform re-started in 1992,, money supply and credit expansion grew at the same level, which meant that bank lending was a major driver behind China's rapid monetization. Total social financing statistics (see Table 4.2) shows a similar pattern: bank credit dominated the indirect financing market. When bank loans in RMB and foreign currency are totaled for 2011, bank credits contributed to more than 60 percent of total financing funds, with an average share of approximately 72 percent between 2002 and 2011.

Figure 4.2 Annual growth rate of M2 and bank loans in China, 1978–2011, %



Source: Author's calculation. World Bank (2013); Almanac of China's Finance and Banking (various issues).

The relative dominance of the banking sector within China's financial system is easy see with an international comparison. The ratio of total banking credit to GDP in China has increased nearly three times during the past 30 years, from 50% in 1980 to around

150% in 2011, which is distinctively fast when compare with other developing economies, as well as with several representative developed economies. By the end of 2011, credit extended by banking institutions in China was nearly 1.5 times over the GDP, which is higher than the average of middle-income economies.[12] Among emerging economies, only South Africa shares a higher ratio than China.

Table 4.2 Composition of Total Social Financing in China, 2002–2011, %

Year	Bank Loans in RMB	Bank loans in foreign currency	Entrusted loans	Trusted loans	Others	Total social financing
2002	91.86	3.63	0.87		1.49	100
2003	81.06	6.70	1.76		8.99	100
2004	79.20	4.82	10.89		2.97	100
2005	78.46	4.72	6.53		7.91	100
2006	73.83	3.42	6.31	1.93	12.52	100
2007	60.88	6.48	5.65	2.85	22.32	100
2008	70.26	2.79	6.11	4.50	14.20	100
2009	68.97	6.66	4.87	3.14	14.61	100
2010	56.67	3.46	6.24	2.76	28.67	100
2011	58.24	4.45	10.10	1.59	22.06	100

Source: China Statistics Yearbook (2012). Composition of Others includes undiscounted bankers' acceptances, net financing of corporate bonds, and equity financing on the domestic stock market by non-financial enterprises.

The process of financial deepening can be captured by assets expansion of the financial sector. Starting in 2003, when the current multi-tier banking system under the supervision of China Banking Regulatory Commission (CBRC) was initially established, total assets of the banking system have grown nearly 5 times (see Figure 4.3), yet still match the speed of China's overall economic development, where the share of banking assets to GDP ratio is steady at two times the GDP. After the announcement by the central government in 2008 of a 4 trillion CNY stimulation package in infrastructure, largely financed through loans via the SOBs, banking assets to GDP ratio started to increase.

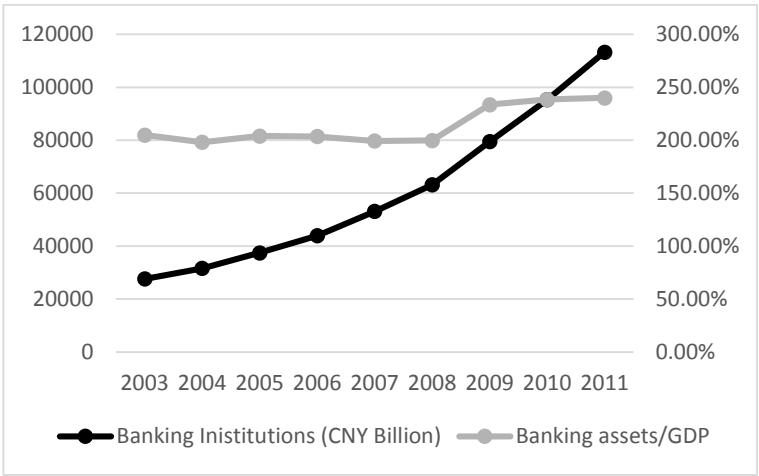
[12] Middle-income economies are defined by the World Bank (2013) as economies with gross national income per capita between 1,036 USD and 12,615 USD in 2012.

Table 4.3 Domestic bank loans to GDP ratio, %

	1980	1990	2000	2005	2010	2011
China	53.29	89.4	119.67	134.3	146.28	145.48
Brazil	43.04	87.63	71.86	74.48	95.22	98.31
Russian	---	---	24.93	22.12	38.39	39.47
India	37.03	49.97	51.39	58.36	71.84	74.12
South Africa	76.35	97.8	152.46	185.89	191.51	174.98
Korea	43.42	51.9	74.7	88.34	103.13	102.66
Japan	185.66	255.9	304.01	317.52	327.96	341.69
United States	120.22	151	198.41	225.44	231.12	232.51
Germany	87.65	101.81	146.49	137.16	130.94	124.83
Low income	20.55	28.26	28.87	33.20	38.90	40.39
Middle income	44.09	61.86	67.36	71.49	90.43	92.40
High income	104.49	142.02	179.30	186.91	203.85	203.20

Source: World Bank (2013).

Figure 4.3 Banking assets and its ratio to GDP in China, 2003–2011



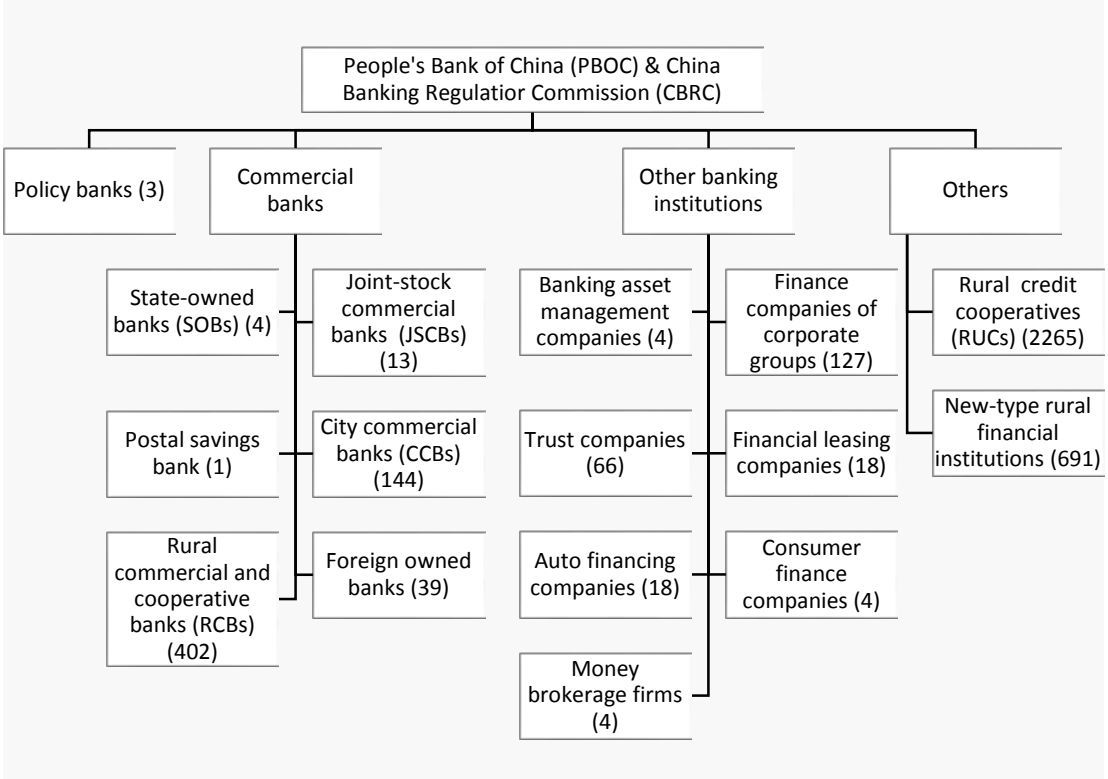
Source: Almanac of China's Finance and Banking (various issues).

4.2.2 Financial broadening

China's financial broadening, however, reflects a more complex picture. As discussed above, there are two levels of financial broadening: the number of financial institutions, and the variety of financial services provided. For the first level, broadening has been achieved to a certain degree, if measured only by the number of financial institutions

(see Figure 4.4). Given that there was only one bank, the People's Bank of China (PBOC) in 1979, and even by 1984, there were only five banks; by the end of 2011, there were 3,800 banking institutions (CBRC, 2012). This includes: 4 SOBs, 3 policy banks, 13 JSCBs,[13] 144 CCBs, 3,359 rural financial institutions (rural credit cooperatives, rural commercial banks, new-type rural financial institutions), and other banks, such the single postal savings bank. Such a rapid spread of banking institutions no doubt eased the public's access to financial services and improved competition within the banking industry. Currently there are more than 3 million people working in the banking industry; and the 4 SOBs and Bank of Communication (BOCOM) employ more than half of these employees, demonstrating these banks' dominant position in the industry.

Figure 4.4 Structure and number of institutions of China's Banking System (by the end of 2011)



Source: CBRC (2012).

[13] Banks of Communication continue to be called joint-stock commercial banks; though the CBRC, together with the four SOBs, are labeled as large commercial banks.

Financial markets, such as bond markets, stock markets, foreign currency markets, and other financial markets were also introduced in China during various reforms. By the end of 2011, there were 2,342 domestic companies listed on the Shanghai and Shenzhen stock exchanges (CSRC, 2012), and more than 100 million Chinese citizens—on average, one in every 13 or 14 people—actively participate in the stock market (Wuhan Evening News, 2012). The Chinese stock exchange is becoming one of largest in the world. According to a report in Chinadaily.com.cn, at the end of 2009 the market capitalization of the Chinese stock exchange reached second place globally (Yu, 2010).

Institutional environments, including both legal and regulatory, were gradually improved. Over the course of the 1990s, several laws, such as the Commercial Banking Law, Central Banking Law, Securities Law, and Insurance Law, were promulgated. The PBOC was the only financial sector regulator until the early 1990s, when a new regulatory framework was created that represented *Yi Hang San Hui* (one (central) bank and three commissions) (see Chapter 3), dividing responsibility for financial sector supervision among these banks. These entities, plus the Ministry of Finance and National Development and Reform Commission (NDRC), jointly participated in additional cross-regulatory financial sector reform (see Table 4.4).

All the foregoing shows that there was rapid institutional expansion of China's financial sector. However, when compared with banks, financing through the financial markets did not play a dominant role. Over the past 30 years, the share of credit in terms of GDP, extended by Chinese banks in RMB, has always been higher than the sum of stock market capitalization and trading value of bonds. This was true except in 2007, when the domestic A-share market reached its peak value but then dropped off dramatically

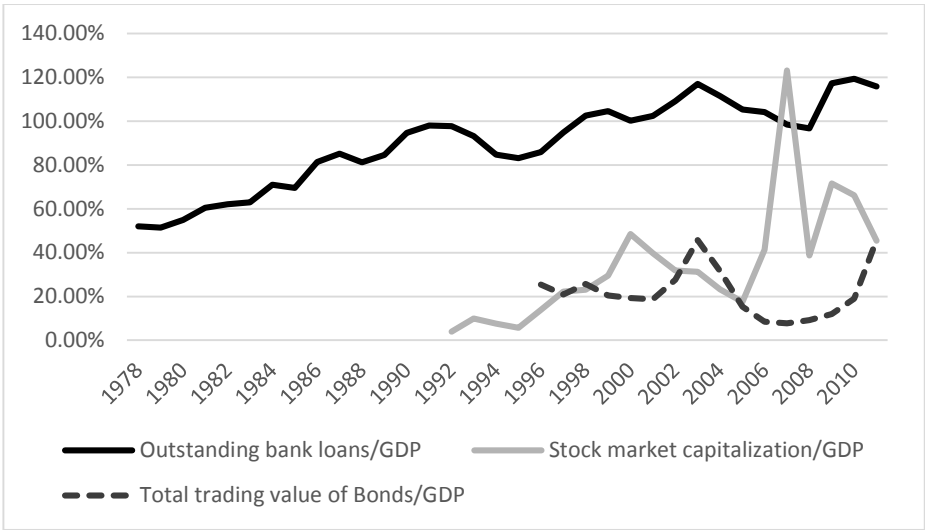
during a cool-down period the following year (see Figure 4.5).

Table 4.4 The responsible entities during financial reform

Reform responsibilities	**Principal entities**
Panda Bonds	PBOC, MOF, NDRC
Bank business model; mutual funds subsidiaries	CSRC, CBRC
Asset-backed securities	MOF, PBOC, NDRC
Forward bond trading	PBOC, CBRC
Commercial paper (CP)	NDRC, PBOC
Bank recapitalization	MOF, PBOC
Failed securities company rescues	CSRC, PBOC
Exchange and interest rate policy	PBOC/SAFE, MOF, LGFEA

Source: Walter & Howie (2011, p. 15). Leading Group for Financial and Economic Affairs (LGFEA), an inner group of the Central Committee of the Communist Party of China, supervises the economic work of both the CPC Central Committee and the State Council. National Development and Reform Commission (NDRC) is a macroeconomic management agency under the State Council. State Administration of Foreign Exchange (SAFE) is a department within the PBOC.

Figure 4.5 Total outstanding bank loans, stock market capitalization, and total trading value of bonds, 1978–2011, in terms of GDP



Source: Almanac of China's Finance and Banking (various issues); China Statistic Yearbook (various issues). Because of unavailable data, stock market capitalization and trading value of bonds were counted after 1992 and 1996, respectively.

In the banking industry, although competition has improved through the introduction of various ownership structures and reforms oriented toward public listings, state ownership (represented by the SOBs) still control the largest stakes (see Table 4.5). In

2011, the Herfindahl Index[14] for China's entire banking industry was 0.052. However, for the SOBs and JSCBs, which operate nationwide, the index was 0.124; this implies a double-market structure: a national market and a local market (Cousin, 2011, p. 11). It is worth noting that a total number of 17 SOBs and JSCBs held 63.5 percent share of the banking sector (see Table 4.6). At the same time, the 144 CCBs were no higher than 9 percent in 2011. A comparison of average assets per institutions tells the same story: SOBs held 12,255.61 billion CNY and JSCB held 1,768.51 in assets, while CCB held only 69.34. This data shows that China's banking sector remained highly concentrated. It is worth noting that not only SOBs, but also other types of banks, are under state ownership; the majority of shareholders of JSCBs are government bodies and SOEs; and the majority shareholders of CCBs are local governments.

Table 4.5 Assets of Chinese banking institutions, 2003–2011, bln CNY

	2003	2004	2005	2006	2007	2008	2009	2010	2011
Banking Institutions (Total)	27658.4	31599.0	37469.7	43950.0	53116.0	63151.5	79514.6	95305.3	113287.3
Policy banks	2124.7	2412.3	2928.3	3473.2	4278.1	5645.4	6945.6	7652.1	9313.3
State-owned banks	15122.6	16837.7	19581.6	22520.7	26397.1	29902.7	37560.1	42942.7	49022.4
Joint-stock commercial banks	3888.5	4791.6	5888.9	7160.3	9377.1	11506.1	15057.8	18855.3	22990.6
City commercial banks	1462.2	1705.6	2036.7	2593.8	3340.5	4132.0	5680.0	7852.6	9984.5
Rural commercial banks	38.5	56.5	302.9	503.8	609.7	929.1	1866.1	2767.0	4252.7
Rural cooperative banks	--	---	275.0	465.4	646.0	1003.3	1279.1	1500.2	1402.5
Urban credit cooperatives	146.8	178.7	203.3	183.1	131.2	80.4	27.2	2.2	3.0
Rural credit cooperatives	2650.9	3076.7	3142.7	3450.3	4343.4	5211.3	5494.5	6391.1	7204.7
Nonbank financial institutions	910.0	872.7	1016.2	1059.4	971.7	1180.2	1550.4	2089.6	2606.7
Foreign banks	416.0	582.3	715.5	927.9	1252.5	1344.8	1349.2	1742.3	2153.5
New-type rural financial institutions & postal savings bank	898.4	1085.0	1378.7	1612.2	1768.7	2216.3	2704.5	3510.1	4353.6

Source: CBRC (various issues).

[14] Herfindahl Index is a proxy to estimate the concentration of an industry: the higher the value of the Herfindahl Index, the higher the level of concentration of the industry.

Table 4.6 Market share and average assets per institution of select types of bank, 2011

	Policy banks	**SOBs**	**JSCBs**	**CCBs**	**Foreign banks**
Total market share (%)	8.22	43.27	20.29	8.81	1.90
# of institutions	3	4	13	144	39
Average assets per institution (bln CNY)	3,104.43	12,255.61	1,768.51	69.34	55.22

Source: CBRC (various issues).

One feature of the evolving formation of today's bank-leading financial system in China is the rapid expansion and generation of new financial institutions; a second feature is that the financial sector is dominated by banks; and a third feature is that banks under state ownership dominate the banking sector. As a result, the SOBs ranked among the top ten largest banks in the world in 2012 (The Banker, 2012), which further verifies Walter and Howie's statement about China: "[B]anks are the financial system" (Walter & Howie, 2011, p. 27).

For all the success of financial deepening of China's financial system, financial broadening was limited, as there was insufficient diversification of financial instruments. Rapid monetization and financial institution expansion with limited diversification leads to the conclusion that financial development in China was "deep but narrow" (Naughton, 2007, p. 449).

4.3 Financial development from the aspect of financial liberalization

Assessing the degree of financial liberalization is vital in understanding financial development. Theoretically, there are two parts of financial liberalization: domestic and external. External financial liberalization is related to international finance, i.e., freeing

international trade, capital account liberalization, and entry of foreign financial institutions. In this section, however, the focus is on domestic financial liberalization. According to the theory of financial repression (McKinnon, 1973; Shaw, 1973), reviewed in detail in Chapter 2, the main argument is that economic policies that lead to financial repression (e.g., control of interest rates and government interventions), will have a negative impact on economic growth, and even hurt long-term economic development. This occurs when there is low efficiency in allocating savings to investment and low levels of savings and investment (Arestis, 2005). Although the theory suffers from several weaknesses and has been questioned, especially its disappointing real-world application, it is still regarded as the theoretical foundation in the literature on the nexus of finance and growth, and a negative relationship between financial repression and long-term economic development has been widely confirmed and accepted in many studies (see King & Levine, 1993b; Roubini & Sala-i-Martin, 1992).

However, neither financial repression nor financial liberalization can be measured directly. Ideally, financial liberalization policies are a combination of relevant economic policies. There are many attempts to generate a single financial reform or financial repression index (FRI) (see Abiad, Detragiache & Tressel, 2008; Kaminsky & Schmukler, 2003; Williamson & Mahar, 1998). However, how to put weight on different dimensions in a grade-based index could be a problem. One way to calculate an estimation, as suggested by Demetriades and Luintel (1996, 1997), is to construct a FRI by means of principal component analysis (PCA). This method makes it possible to combine different financial sector indicators that contain information on the changes delivered by different financial policies, providing an overall assessment of the degree of financial repression or liberalization. Additionally, the PCA method, to a certain

extent, helps overcome econometric problems such as multicollinearity and overparameterization, which usually occur during empirical studies on finance and growth (Ang & McKibbin, 2007).

There is no strict model or standard for generating an FRI. According to representative applications for China (see Huang & Wang, 2011; Laurenceson & Chai, 1998, 2003), however, the following elements need to be considered: (a) control of interest rates, which is usually measured by a real interest rate or the degree of government regulation on the prices of credit; (b) control of financial intermediation, which can be reflected by credit ceilings or the central government's reserve requirements of financial institutions; and (c) involvement of the government in banks' lending decision making, which can be estimated by the proportion of SOBs lending to state sectors over total bank lending.

In this thesis, the discussion of financial repression will be thus focused on the above three aspects. To construct a FRI to estimate China's overall level of financial repression, we largely follow Huang & Wang (2011). In contrast to one of the most widely used FRI that constructed by Abiad, Detragiache, & Tressel (2008), the FRI generated in the thesis only focuses on domestic banking sector liberalization so that the influences from, for example, securities market liberalization, capital account liberalization are not covered.

4.3.1 Interest rates control

Interest rate liberalization is seen as the central to financial liberalization. Interest rate ceiling policies are widely adopted in the developing world to provide cheap working capital for developing targeted industries. This also occurred in China, prior to the 1978

reforms: interest rates were kept artificially low to accommodate the economic strategy of developing heavy industries. When policies that manipulate interest rates are loosened or removed, it is anticipated that there will be increased competition among financial institutions to generate savings deposits. At the same time, if it is assumed that interest rates are market driven, then lending rates should become indicative of market risks.

In 1979, China's interest rates were restored to their pre-Cultural Revolution level (Lin, Cai, & Li, 2003, p. 176), and in 1996, the formal marketization process of interest rates was started when the interbank offered rates were opened. After 2012, 119 different interest rate ceilings, regulations, and controls were loosened or removed (People's Bank of China, 2014a). Banks were given autonomy on interest rates starting in 2004, when ceilings on lending rates were abolished by the PBOC and floors for deposit rates were loosened.

Although overall interest rate control was loosened, the trend of deposit rates is hard to capture (see Table 4.7). In years with high inflation, deposit rates were negative, which may suggest the limited progress of financial liberalization on the other hand.

Although both positive real deposit rates and real lending rates were maintained in most of the four phases of reform (see Chapter 3), for Riedel et al. (2007, p. 78), these rates are far lower than the opportunity cost of returns on investment, which means that interest rates are not reflecting the real price of capital. When control over interest rates control is fully removed, interest rates thus can be used as market anchors.

Table 4.7 China's interest rates, 1980–2011, %

Year	NDR	NLR	Inflation	RDR	RLR
1980	5.40	5.04	6.00	-0.57	-0.91
1981	5.40	5.04	2.40	2.93	2.58
1982	5.76	7.20	1.90	3.79	5.20
1983	5.76	7.20	1.50	4.20	5.62
1984	5.76	7.20	2.80	2.88	4.28
1985	7.20	7.92	8.80	-1.47	-0.81
1986	7.20	7.92	6.00	1.13	1.81
1987	7.20	7.92	7.30	-0.09	0.58
1988	8.64	9.00	18.50	-8.32	-8.02
1989	11.34	11.34	17.80	-5.48	-5.48
1990	8.64	9.36	2.10	6.41	7.11
1991	7.56	8.64	2.90	4.53	5.58
1992	7.56	8.64	5.40	2.05	3.07
1993	10.98	10.98	13.20	-1.96	-1.96
1994	10.98	10.98	21.70	-8.81	-8.81
1995	10.98	12.06	14.80	-3.33	-2.39
1996	7.47	10.08	6.10	1.29	3.75
1997	5.67	8.64	0.80	4.83	7.78
1998	3.78	6.39	-2.60	6.55	9.23
1999	2.25	5.85	-3.00	5.41	9.12
2000	2.25	5.85	-1.50	3.81	7.46
2001	2.25	5.85	-0.80	3.07	6.70
2002	1.98	5.31	-1.30	3.32	6.70
2003	1.98	5.31	-0.10	2.08	5.42
2004	2.25	5.58	2.80	-0.54	2.70
2005	2.25	5.58	0.80	1.44	4.74
2006	2.52	6.12	1.00	1.50	5.07
2007	4.14	7.47	3.80	0.33	3.54
2008	2.25	5.31	5.90	-3.45	-0.56
2009	2.25	5.31	-1.20	3.49	6.59
2010	2.75	5.81	3.10	-0.34	2.63
2011	3.50	6.56	4.90	-1.33	1.58

Source: International Monetary Fund (2013). NDR = nominal deposit rate of interest; NLR = nominal lending rate; RDR = real deposit rate; RLR = real lending rate. NDR is measured by official interest rates on institutional and individual deposits with one-year maturity. NLR is measured by the official rate on working capital loans with one-year maturity; prior to 1989, it was the official rate on working capital loans to state industrial enterprises. When the nominal interest rate changed during a year, a weighted average is constructed. The interest rate is calculated as (1+Nominal Interest rate) / (1+Inflation rate) –1. Inflation. It is measured by the overall Retail Price Index on an annual basis.

Criticized by many observers, low real interest rates stimulate demands for bank loans, which leads to an inordinate supply of bank credit, and hence to excessive investment in

the Chinese economy. However, an excessive supply of cheap bank credit causes high inflation, which results in even lower interest rates and cheaper bank credit, leading to an explosion in NPLs. Low deposit rates have also caused an "implicit" tax imposed on net savers (Lardy, 2008) that largely benefits SOEs, as they are the major borrowers in China's banking system.

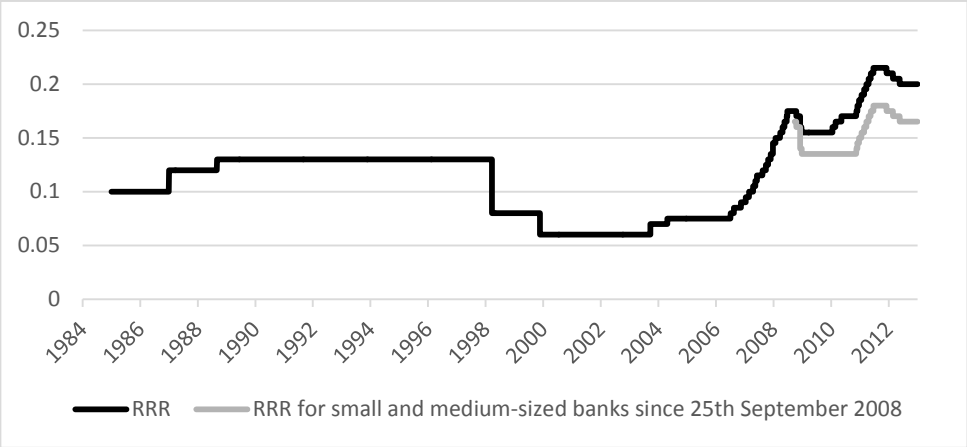
4.3.2 Financial intermediation control and regulation

A statutory reserve requirement ratio (RRR) is the most often used tool used by the PBOC (Ma, Yan, & Liu, 2011). An RRR was introduced in 1984, following the establishment of China's two-tiered banking system. In 1984, the RRR was set at 20%, 25%, and 40% for corporate, agriculture, and savings deposits, respectively, and in 1985, a unified RRR of 10% was adopted. In 2008, a more formal two–tiered reserve requirement system was established, in which different RRRs were created related to bank size. By the end of 2012, RRRs had been adjusted 45 times by the PBOC, though for most years the ratio was between 5% and 15% (see Figure 4.6). Starting in 2010, the RRR reached 20%, mainly due to high inflation pressure in China started in 2008 with the world financial crisis; this percentage is widely accepted as the boundary of a high or excessively high reserve requirement (Abiad, Detragiache, & Tressel, 2008). This may suggest that China's statutory RRR is too high (Johansson, 2012).

Reserve requirement ratios are not only tools for the state to control market liquidity and money supplies (Yan, Liu, & Ma, 2012), but also are tools to finance the government. As the return rate on required reserves is set lower than the rate of traditional savings deposits, as much as 50 percent lower, the high RRR provides cheap

loans to the central bank. However, a side effect is low interest rates earned by the reserves, leading commercial banks to pass financial burdens onto depositors by lowering interests on deposits or raising rates on loans, thus imposing implicit taxes on both savers and lenders (Riedel et al., 2007). Several estimates have been made to understand the exact effect of such implicit taxes and to compare the change of deposit and loan ratios in major Chinese banks, and it was found that depositors, rather than lenders, carry a higher financial burden (see Ma et al., 2011).

Figure 4.6 Statutory reserve requirement ratio, %



Source: People's Bank of China (2014b).

The promulgation of the Central Banking Law and Commercial Banking Law in 1995, and the establishment of new regulatory bodies, such as the CSRC, SIRC and CBRC, have switched the methods and channels of banking control from an administrative framework to a modern regulatory framework. Direct credit control, including annual credit plans and lending ceilings for banking institutions, were abolished in 1998, though some alternative controls still exist. For example, article 39 of the Commercial Banking Law imposed a loan-to-deposit ratio regulation, so that the amount of loans to deposits in commercial banks cannot exceed 75 percent. This can be seen as a substitute policy on lending ceilings. The banking lending ceilings, known as credit scale

regulations, imposed by the PBOC, were occasionally replaced by even broader regulation instruments, such as the growth of M2/GDP ratio (Ma, 2011).

4.3.3 State influence on Lending

Although official credit plans, legacies from central planning, were abolished in 1998, the influence of the state on bank lending remains significant. Despite the establishment of three policy banks, which are designed to be in charge of lending for developmental purposes so that SOBs handle commercial purposes (i.e. profits seeking), SOBs continue to lend to SOEs. However, this is not the same for banks that do not follow market principles. Over the course of all four reform periods, the target of commercialization has never changed. One reason, raised by Lu and Yao (2009), is that lending to SOEs is still a rational choice because they are usually large firms. Based on the commercial criteria in loan decision making in China, larger firms usually carry a lower risk of default. Conversely, private firms, most of which are small- or medium-sized firms, are assumed to carry a higher risk and, thus, are not favored by loan officers.

As mentioned earlier in this thesis, it is hard to measure the degree of direct government involvement in lending practices because of the lack of available and accurate state instruments. Laurenceson and Chai (2003, p. 18) introduced two assumptions: all credits extended by SOBs to SOEs involve government intervention, and all credits extended by other financial institutions are market-determined. Laurenceson and Chai then constructed a rough proxy to see whether or not direct lending has improved. Despite the potential of inaccurate measurements, Laurenceson and Chai found that between 1978 and 1999, lending decisions with government intervention decreased

from nearly 90% to 75%. Huang and Wang (2011) found another possible measurement, which is to split government influence in credit allocation into two parts that can be measured separately by two indicators. The first measurement is the proportion of loans extended by SOBs to all bank loans, and the second is the share of total loans allocated to the state sector over total loans. Although Huang and Wang did not provide details about how their indicators were constructed, according to publicly available data, the first measurement may tend to underestimate state influence on banks. While the four SOBs and three policy banks are fully under state control, the JSCBs and CCBs are hard to classify. Meanwhile. the second measurement may overestimate the share of loans granted to the state sector according to the aggregated loan classification. There is no category for direct "loans to state sector" or "loans to SOEs"; only short-term loans to Township and Village Enterprises (TVEs), the agricultural sector, private enterprises, and individuals are labeled. Additionally, there is no classification by ownership given to industrial, commercial, and construction loans, or to medium- and long-term loans. The inaccuracy of such measurements is certainly due to the structure and features of the raw data. This potential for underestimation or overestimation affects not only Huang and Wang and Laurenceson and Chai, but all the studies that focus on credit allocation by ownership type in China. Even so, the evolving information can be useful.

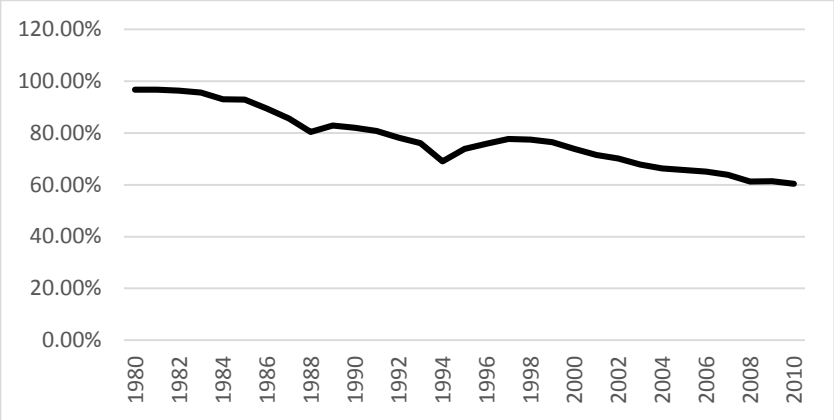
Adding up the loan statistics of the four SOBs and three policy banks[15] allows for a narrow estimation about the influence of state banks in total bank lending. The share of state banks in total banking lending has gradually declined from nearly 100% in 1978, to about 60% in 2010 (see Figure 4.7). Although they still account for the majority of bank lending, this shows that the influence of state banks in China's banking system has decreased. However, to what extent a pure commercial profit-and-risk lending standard

[15] Rural credit cooperatives and postal deposit bank are not included here.

has been adopted in state banks remains unclear.

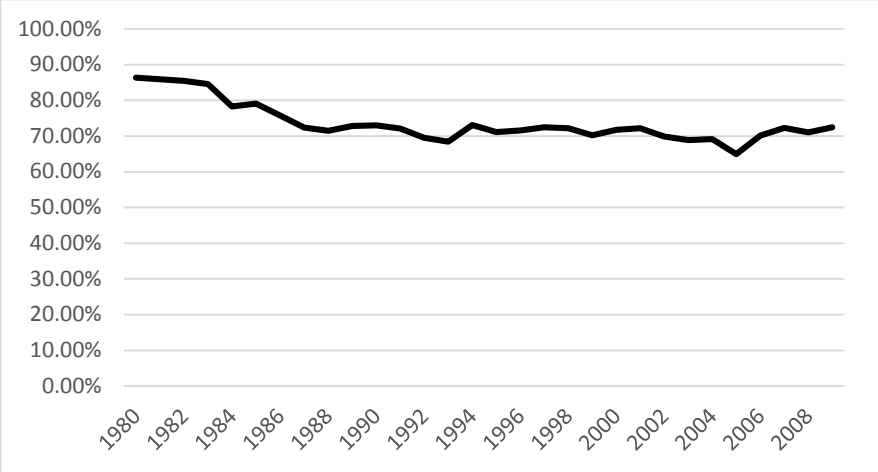
To measure the proportion of loans allocated to the state sector, it is important to first know which loans are made to non-state sectors. These include loans to the agricultural sector; TVEs; foreign-funded, joint venture, and cooperative enterprises; private enterprises; individuals; and non-classified. (Additionally, before 1989, this included loans from the RCCs, UCCs, and TICs.) By subtracting the loans in these categories from the total number of loans, a broad estimation of the percentage of total credits allocated to the state sector is possible. As seen in Figure 4.8, the share of state sector in total credits extended has declined from nearly 90% in 1978 to approximately 70% in the early 1990s. The ratio has since fluctuated, though it has remained around 70%.

Figure 4.7 Proportion of loans extended by state banks to total bank lending, 1980–2010, %



Source: ICBC (various issues); BOC (various issues); CCB (various issues); ABC (various issues); CDB (various issues); EXIMB (various issues); and ADBC (various issues); Almanac of China's Finance and Banking (various issues). Data is available only for the four SOBs prior to 1994, not the three policy banks; and aggregated loan data became available only after 1989. Aggregated loan data for UCCs and TICs became available only in 1986. To measure total banking lending prior to 1989, the loan data from SOBs, RCCs, UCCs, and TICs were combined (see Laurenceson & Chai, 2003, p. 10).

Figure 4.8 Proportion of loans extended to state sector over total bank lending, 1980–2009, %



Source: Almanac of China's Finance and Banking (various issues). Aggregated loan data became available only after 1989. Aggregated loan data for UCCs and TICs became available only in 1986. To measure total banking lending prior to 1989, the loan data from SOBs, RCCs, UCCs, and TICs were combined (see Laurenceson & Chai, 2003, p. 10).

However, as mentioned above, this measurement may be overestimation. That is to say, the actual share of the state sector in all bank loans granted would be no greater than 70%. Furthermore, this estimation does not show how SOBs and SOEs are linked. There is no consistent, aggregated data publicly available on the amount SOBs have lent to SOEs. The only data is from banks' annual reports, and these data are not published in the reports every year. The SOBs are not willing to report specific data on lending practices to SOEs, as they are labeled as "commercial banks." For example, the CCB reported lending to SOEs in its annual reports between 2004 and 2008, but in other years such data is not included. Although the amount the CCB lent to SOEs nearly doubled between 2004 and 2008, the share in CCB's total loan portfolio slightly declined, from 37.66% in 2004 to 33.28% in 2007 (see Table 4.8). The increase in lending to SOEs in 2008 is a unique case; it was a 4 trillion CNY stimulus package pushed by the Chinese government to counter the global financial crisis.

Table 4.8 Loan portfolio of China Construction Bank, 2004–2008, %

Year	State-owned enterprises	Joint-stock enterprises	Private enterprises	Personal loans	Total Loan
2004	37.66	15.72	6.85	18.53	100
2005	34.35	15.23	8.73	18.48	100
2006	33.45	13.63	11.34	20.86	100
2007	33.28	12.71	12.76	22.60	100
2008	35.07	10.42	14.03	22.02	100

Source: CCB (various issues).

For more than a decade, the literature has described the lending behaviors of Chinese banks as, "80% of state-owned bank loans have been extended to state-owned enterprises" (Laurenceson & Chai, 2003, p. 9; see Boyreau-Debray, 2003). This implies that for each SOB, the proportion of loans to SOEs should be around 80%. However, the loan statistics for the CCB tell a different story. In 2011, the CCB, one of the four major SOBs, was responsible for more than 10% of total banking sector lending, yet the number of its personal loans accounted for more than 20% of its loan portfolio (CCB, 2012).

The above analyses lead to two interpretations. The first is that the credit allocated to the state sector, in proportion to total credit, has declined throughout the four phases of reform. The second is that by combining broad estimations and data from the CCB, the percentage of loans to the state sector from the second half of 2000s was between 35% and 70%. The low percentage of lending to SOEs by the CCB, and the broad measurement of 70% from the other SOBs, suggests that non-SOBs also lend heavily to the state sector.

The decreased share of SOBs in total lending, and the decreased share of the state sector in all credit allocated, certainly indicate that the influence of the state sector in lending decisions has declined. One possible reason is that all the four SOBs are now publicly

listed, not only on the domestic A-share markets but also on the Hong Kong stock exchange. This means that these banks face increased pressure from both boards of directors and shareholders. Being audited by stricter accounting principles not only increased corporate governance in the SOBs, but also lessened state sector interventions in lending decisions. At the same time, senior management in the SOBs are under pressure to not make any faulty decisions in order to protect their careers, as senior staff are still considered to be state officials. A loan officer is more willing to lend to an SOE as a "safer" choice, because a loan default by a private firm can lead to a loan officer being investigated for possible "under-the-table benefits," which can disastrous in a professional career (Lu & Yao, 2009, p. 2). The above two reasons, from the two different side, combine together and leave the decision of loan extending in SOBs an even more complex circumstance.

4.3.4 Financial liberalization

Financial liberalization in China has been shown from three different angles: control of interest rates, control of financial intermediation, and state intervention in lending decision making. However, to capture the overall trend of financial liberalization in China, a principal component analysis must be applied so as to construct a financial repression index.

Table 4.9 Summary of data for FRI construction

Year	RDI	FIC	SOB	SSL
1980	0.5	0.340	0.967	0.864
1981	0	0.350	0.967	0.859
1982	0	0.350	0.963	0.854
1983	0	0.330	0.956	0.845
1984	0	0.200	0.931	0.783
1985	0.5	0.100	0.925	0.791
1986	0	0.100	0.894	0.757
1987	0.5	0.120	0.856	0.724
1988	1	0.130	0.805	0.715
1989	1	0.130	0.829	0.728
1990	0	0.130	0.820	0.730
1991	0	0.130	0.808	0.721
1992	0	0.130	0.782	0.695
1993	0.5	0.130	0.761	0.684
1994	1	0.130	0.690	0.679
1995	0.5	0.130	0.739	0.668
1996	0	0.130	0.759	0.672
1997	0	0.130	0.777	0.724
1998	0	0.080	0.774	0.722
1999	0	0.060	0.765	0.702
2000	0	0.060	0.739	0.717
2001	0	0.060	0.715	0.722
2002	0	0.060	0.702	0.699
2003	0	0.070	0.678	0.688
2004	0.5	0.075	0.663	0.691
2005	0	0.075	0.658	0.649
2006	0	0.090	0.651	0.701
2007	0	0.145	0.660	0.723
2008	0.5	0.155	0.634	0.711
2009	0	0.155	0.633	0.725

Source: Author's calculations.

In this thesis, four variables were considered in generating the FRI. Variable 1, real deposit interest rates (RDI) (see Table 4.7) is treated as dummy variable set to 0 if the RDI is positive, set to 0.5 if RDI is between -5% to 0; and set to 1 if the RDI is lower than -5%. Variable 2, which measures financial intermediation control (FIC), is the statutory RRR[16] (see Figure 4.6), given that a higher RRR implies stricter control on

[16] To measure FIC prior to 1989, when there were no statutory RRR policies, the FIC was set as the ratio of deposits that the central bank could not allocate itself. These deposits included deposits of basic construction, fiscal deposits, and deposits of non-profit institutions (see Huang and Wang, 2011, p. 838).

financial intermediation. Variable 3 is the ratio of bank loans extended by state banks to total bank lending (SOB), and Variable 4 is the ratio of bank loans extended to state sector over total bank lending (SSL). Variables 3 and 4 are jointly applied as an indicator of state intervention in bank lending (see Figures 4.7 and 4.8). In this thesis, the lower the value of the variables, the lower the FRI, which implies lower repression of the financial system; a value of 0 implies a totally liberalized system. This sample covers from 1980 to 2009, because an SSL for 2010 is not available. The summary of data is shown in Table 4.9; the correlation of these variables is shown in Table 4.10.

Table 4.10 Correlation matrix of FRI variables and relevant appropriation tests

Variable	RDI	FIC	SOB	SSL
RDI	1			
FIC	-0.0132	1		
SOB	0.0043	0.6863	1	
SSL	-0.1155	0.8455	0.8317	1

Source: Author's calculations. Result of the Kaiser-Meyer-Olkin test is 0.639. Result of the Bartlett test is $Chi^2 = 67.430$, *p*-value = 0. These indicate the suitability of applying PCA into the analysis when compared with suggestive critical values.

The results of the PCA analysis for generating an FRI are in Tables 4.11 and 4.12. As the eigenvalue for the third and fourth components are lower than 1, the first two components were selected, as they explain nearly 90% of the total variance.

Table 4.11 PCA Results

Component	**Eigenvalue**	**Proportion**	**Cumulative**
1	2.5813	0.6453	0.6453
2	1.0055	0.2514	0.8967
3	0.3137	0.0784	0.9751
4	0.0995	0.0249	1.0000

Source: Author's calculation

Table 4.12 PCA Results

Variables	Component 1	Component 2	Component 3	Component 4
RDI	-0.0471	0.9939	0.0215	0.0977
FIC	0.5659	0.0553	0.6934	-0.4426
SOB	0.5619	0.0815	-0.7199	-0.3993
SSL	0.6016	-0.0503	0.0218	0.7969

Source: Author's calculation

The FRI is formulated as:

$$\text{FRI} = 0.7196 * \text{Component 1} + 0.2804 * \text{Component 2} \quad \text{(Eq. 4.1)}$$

Where

$$\text{FRI}_{Comp1} = -0.0471 * RDI + 0.5659 * FIC + 0.5619 * SOB + 0.6016 * SSL$$

(Eq. 4.2)

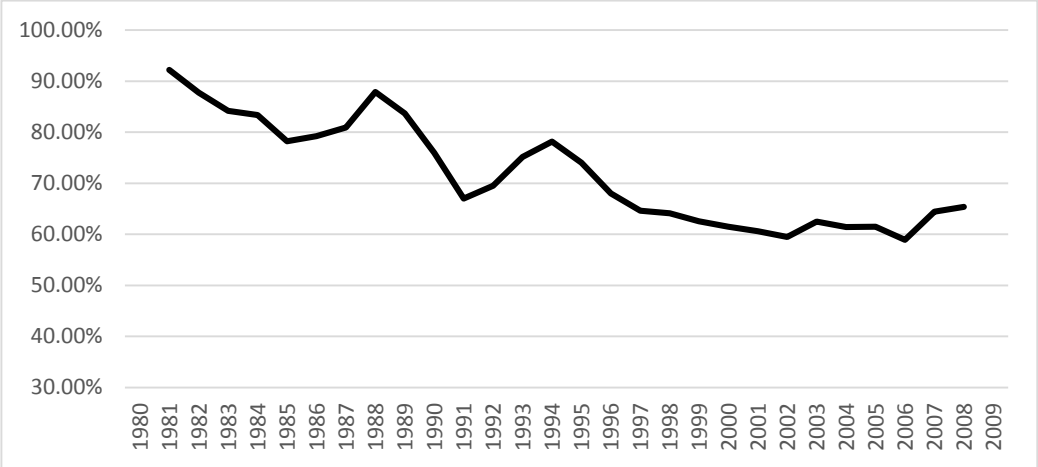
$$\text{FRI}_{Comp2} = 0.9939 * RDI + 0.0553 * FIC + 0.0815 * SOB - 0.0503 * SSL$$

(Eq. 4.3)

By setting the value of FRI for 1980 as 1,[17] Figure 4.9 shows the movement of the FRI. Included is a 3-year moving average value of the constructed FRI, so as to smooth or eliminate short-term shocks, that is, dramatic variation due to the use of dummy variables. Generally, the gradual decrease of the FRI from 100% in 1980 to around 60% in 2009 indicates significant financial liberalization in China. Despite substantial fluctuation between the late 1980s into the early 1990s, the major trends have been moderate, which mimics the gradual financial reforms assessed earlier in this thesis. However, although 2005 had the lowest FRI, with a ratio of 59%, the significantly high value of FRI may suggest that the progress of financial liberalization remains limited.

[17] Though reforms started in 1978, data is only available starting in 1980.

Figure 4.9 Financial repression index for China, 1980–2009, %, 3-year moving average



Source: Author's calculations.

By linking the FRI with the three angles of financial liberalization discussed above, some important ideas can be drawn. First, over the 30 years' of reform, various kinds of interest rates have been liberalized to certain extents, though the major deposit and lending rates remain regulated by the central bank, leading to limited floatation. A positive real deposit rate can be found for most years, but it is still not sufficient to reflect the real opportunity cost of investment returns on the market. Second, the statutory reserve requirement is frequently used as a monetary tool by the state; and since the end of direct credit quota control, it is becoming a major tool for financial intermediation control. The main side effect, implicit taxes — caused by the relatively high reserve requirement ratio over the past few years — have passed from the commercial banks to depositors. Third, it is impossible to know which loans are generated by state intervention and which by banks without state pressure. What is known is that the decrease in shares of SOBs in total banking lending and the decrease in lending to the state sector shows that SOBs' dominance in the banking sector has gradually diminished over the last 30 years. Finally, the FRI, based on the constructed PCA, confirms that financial liberalization, though limited, has occurred in China. It needs to be pointed out that financial repression still occurs in China. However, China's

economic growth over the last 30 years leaves inconclusive the question of whether this financial repression will be harmful to China's long-term economic development.

4.4 Conclusion

In this chapter, China's financial development was assessed and defined from a standard approach. This occurred by emphasizing the role of monetization and financial liberalization in the financial sector's development. In the first section, the degree of financial development in China was estimated using the concepts of financial deepening and financial broadening. Monetary expansion occurred quickly, which is reflected in the substantial increase of the M2/GDP ratio. However, the speed of the monetization process was largely due to an expansion in bank credit, as seen in the nearly uniform rate of growth between M2 and total bank loans. Additionally, it was pointed out the banking sector has remained the dominant player among all financial intermediations, which leaves little room for the development of financial markets.

In Section 4.2, the level of financial liberalization in China was evaluated from the perspectives of interest rate liberalization, control of financial intermediation (through the use of statutory RRRs), and state intervention in bank lending. A financial repression index was constructed using PCA to show the evolving degree of financial liberalization in China. Based on this empirical result, it was concluded that, although significant financial liberalization has occurred over the four phases of financial reform, financial repression remains relatively high.

Rapid monetization and financial repression are two factors in China's financial development. High degrees of financial deepening and broadening do not suggest that

China has achieved an overall high level of financial development, as these two aspects are only one dimension of financial development——from a quantitative angle. Conversely, it does not mean that China's economic growth has been undermined because there has not been complete financial liberalization. Before further assessment can be made, to conclude the positive correlations between monetization and economic development and between financial liberalization and economic development in post-1978 China is not convincing.

Chapter 5

Defining financial development in China from the aspect of allocative efficiency

5.1 Introduction

In Chapter 2, it was discussed that an allocative efficiency view of financial development is built on a theoretical framework, which Levine (1997, 2005) called the "functional view of finance." Taking advantage of both the financial repression models (McKinnon, 1973; Shaw, 1973) and the endogenous financial intermediation models (Diamond, 1984; Diamond & Dybvig, 1983), in the functional view of finance, the objectives of developing a financial system are to overcome informational asymmetry and transaction costs involved in financial activities. Several basic functions of financial intermediation, such as mobilizing savings, processing information, and risk amelioration, are assumed to smooth market frictions. In other words, the development of a financial system will contribute to the overall efficiency of finance processes; that is, the transfer of savings into investment funds.

However, it is hard to directly estimate efficiency. One frequently used indicator, first developed by King and Levine (1993a), is the ratio of credit issued to the private sector to GDP. Under the assumption that the private sector is always more efficient than the rest of the economy, an increasing share of credit issued to the private sector over GDP implies improved efficiency through the process of allocating financial resources. When applied to case studies that include China, if this assumption holds (emphasizing a more efficient private sector), the proportion of credit extended by non-state-owned banks

(non-SOBs) and the proportion credit extended to non-state-owned enterprises (non-SOEs) can be used as an indicator to illustrate allocative efficiency in China's financial system. The logic behind is straightforward: a higher proportion of credits extended by non-SOBs or to non-SOEs would imply a more market-based loan-granting mechanism throughout the financial sector and thus improved allocative efficiency.

In Figure 4.7 in Chapter 4, the share of state banks loans to total bank credit declined from nearly 100 percent in 1980 to around 60 percent in 2010. This may imply an amendment in overall banking resource allocation, if non-SOBs are assumed to be more efficient than SOBs in facilitating investment. A similar interpretation can be made from Figure 4.8; from the allocative efficiency view of finance development, decreasing shares of both SOBs in total loans provision and shares of SOEs in total credit issues may indicate potential improvement in the efficiency of financing. Allocating financial resources into more productive investment projects, from both supply and demand sides of investment financing, may cause this efficiency.

However, one problem with using a static measurement of efficiency is the validity and robustness of the preconditions, such as whether non-SOBs and non-SOEs are really more productive, or at least more profitable, than SOBs and SOEs. Without a comparative analysis of the performances of SOBs and non-SOBs, and SOEs and non-SOEs, assuming a more efficient private sector can be misleading. Therefore, in this chapter, focus will be given to determining if the assumption of a "more efficient private sector" holds.

5.2 SOEs and non-SOEs

A common view is that China's market-oriented reforms are the only reasons for the state's distinct economic achievements over the past 30 years, yet the literature continues to mark the state-owned sector, especially the SOEs, as "inefficient" institutions, especially when compared to private firms, which are driven by market-based principles. However, because of ongoing SOE reforms, especially ones concerning improved productivity and profitability, the solidity of this view must be questioned.

5.2.1 Profitability of SOEs

Stronger financial performances by non-SOEs over SOEs can be observed, even within the past few years. That is not to say, however, that SOE improvement has been insignificant. Anderson (2006, p. 24) points out the net profit margin (as a share of revenue) of SOEs began to exceed that of other types of industrial enterprises starting in 2000. Using an industrial-level dataset, Lu et al. (2008), among others, examined the profitability of Chinese firms. By classifying firms into SOEs, private enterprises, or foreign-invested enterprises, according to ownership structure, Lu et al. documented that although the pre-tax profitability on equity and net fixed assets of private enterprises remain higher than that of SOEs in their firm-level data sample, the gap in profitability is diminishing. For example, in 1998, there was a 10% gap in pre-tax profitability on equity between private enterprises (at 12%) and SOEs (at 2%), which narrowed to around 5% in 2005 (at 17% and 13% respectively). The narrowing gap of profitability can be seen as one outcome of SOE reforms.

Furthermore, an overall trend in profitability — a U-shaped curve of pre-tax profitability on equity for SOEs — has been recorded since 1993 (Lu et al., 2008). SOE profitability decreased from 8% in 1997, down to nearly 2% in 1998, and then it rose to approximately 14% in 2006. Given the background of SOE ownership reform under the principle of *Zhua Da Fang Xiao (*grasping the large and letting the small go), the sharp rise in profitability illustrates the efficacy of the SOE reforms. Knight and Ding (2012, p. 158) interpreted this as a policy response to the concerns over slashed state revenue, bad nonperforming loans (NPLs) in the banking sector, and the possible slowdown of economic growth caused by SOE unprofitability.

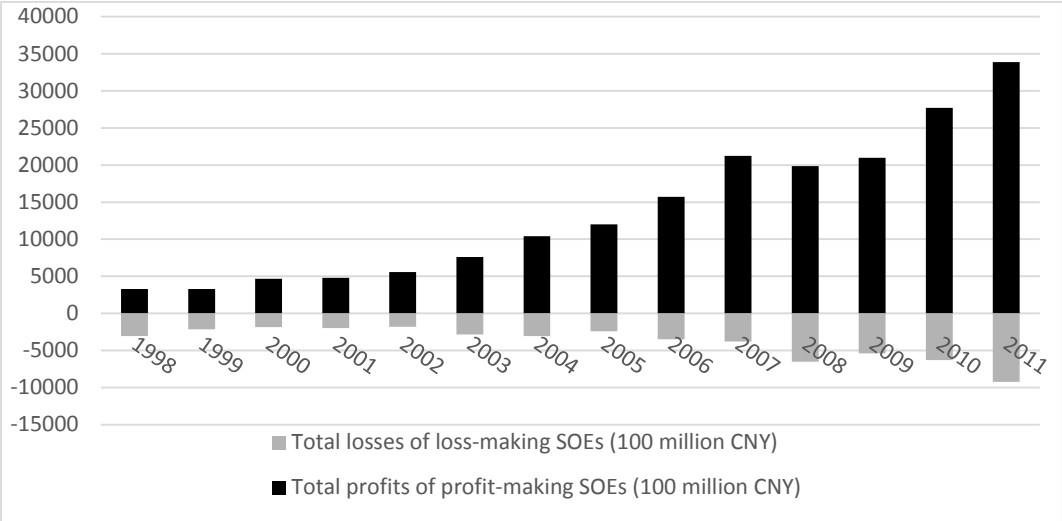
Table 5.1 summarizes several key financial proxies of SOEs from 1997 to 2011. Starting in 1997, which is the first year aggregated data is available, the percentage of SOEs with net profits increased substantially, from 34.1% in 1997 to 60% in 2011. During this same time period, the total number of SOEs was nearly halved, from 262,000 to 136,000. Despite this decline, which implies mergers, bankruptcies, or reorganizations of SOEs during this period, there was also a rapid accumulation of SOEs' total assets and increased ability to make profits. The growth in SOEs' profitability can be illustrated by deconstructing net profits into profits and losses (see Figure 5.1), with the result that total profits contributed by profit-making SOEs increased dramatically. However, the total losses from struggling SOEs became worse.

Table 5.1 Major financial indicators of SOEs, 1997–2011

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Consolidated number of enterprises (10,000)	26.2	23.8	21.7	19.1	17.4	15.9	14.6	13.6	12.6	11.6	11.2	11	11.1	11.4	13.6
Total assets (100 million CNY)	124975.2	134779.9	145288.1	160068	179244.9	180218.9	199709.8	215602.3	255687.2	291278.2	362058.1	416219.2	514137.2	640214.3	759081.8
Total net assets (100 million CNY)	46164.6	50370.7	53813.2	57975.6	61436.2	66543.1	70990.8	76763.2	87386.9	98014.4	144595.6	166510.8	198720.3	234171.1	272991
Sales revenue (100 million CNY)	68132	64685.1	69136.6	75081.9	76355.5	85326	100160.9	120722	140726.6	162390.3	194835.3	229397.9	243015.4	314993.9	386341.4
Total profit (100 million CNY)	791.2	213.7	1145.8	2838	2811.2	3786.3	4769.4	7368.8	9579.9	12193.5	17441.8	13335.2	15606.8	21428.2	24669.8
Profit-making enterprises (%)	34.1	31.3	46.5	49.3	48.8	50.1	47.4	48	50.1	53.6	56.5	56.8	58.6	60	59.6
Assets-liabilities ratio (%)	67.1	65.5	65.4	66	65	64.8	65.9	65.7	65.1	67.4	68.7	61.6	62.8	63.4	64
Return on total assets (%)	2.3	2.1	2.7	3.3	3.3	3.6	3.5	4.5	5	5.5	6.4	4.6	4.2	4.6	4.6
Profit margin on net assets (%)	1.7	0.4	2.1	4.9	4.6	5.7	6.7	9.6	11	12.4	12.1	8	7.9	9.2	9
Profit margin on sales (%)	1.2	0.3	1.7	3.8	3.7	4.4	3	6.1	6.8	7.5	9	6	6.6	7	6.6
Current ratio (%)	100.7	99.5	99.8	105.2	104.4	104.7	104.1	103.6	103.1	103.7	108.2	98.1	102.2	107.7	106.3
Profit earning multiple (%)	1.2	1.1	1.4	1.9	1.9	2.2	3	4	5	5.3	5.8	2.9	4.3	4.8	4.3
Ratio, unhealthy assets to equity (%)	22.6	24.8	27.5	31.4	31.2	31.2	28.5	--	---	---	--	--	--	--	--
Total state-owned assets (100 million CNY)	44340.2	48051.6	53306	57554.4	59827.2	65476.7	70405.6	77345.6	87831.6	96170.6	112205.8	134365.5	157398.3	185364.6	217307.7

Source: Finance Yearbook of China (1999, 2008, 2012).

Figure 5.1 Total profits and losses of SOEs, 1998–2011



Source: Finance Yearbook of China (1999, 2008, 2012).

There have been several changes in the SOEs' financial condition between 1998 and late 2010s, primarily due to the reforms. As already noted, the number of SOEs was halved, yet profitability improved. However, while the percentage of profit-making SOEs increased, the net losses of profit-losing SOEs also increased. One interpretation to such a mixed picture is that the overall financial performance of SOEs is ameliorating, mainly due to the early successful SOEs. For the unsuccessful SOEs, some were shut down by the state, which is reflected in the decreased number of SOEs. Some were able to make up deficits and gain surpluses with the help of the reforms; this number is reflected in the increased share of profit-making SOEs. For the rest, their balance sheets became worse around 1998 with a wave of SOE ownership reforms. As a result, by multiplying the total number of SOEs by the share of profit-making SOEs, the number of unprofitable SOEs can be derived. In 1998, 163,500 SOEs had a net loss of 306.7 billion CNY, while in 2011, 54,900 SOEs had a net loss of 921.9 billion CNY.

There are several ways to explain the SOEs' seemingly successful increase in profitability in one

decade's time. First, as discussed in Chapter 3, ownership reform under the principle of *Zhua Da Fang Xiao* encouraged transforming small- and medium-sized SOEs into private firms or other ownership structures, while profit-losing SOEs were allowed to shut down. This shows that the self-adaptive capacity of SOEs has been strengthened. Second, and also due to *Zhua Da Fang Xiao* ownership reform, most of the remaining large SOEs are resource-based, capital-intensive monopolies or industries protected by the state for national security. Given the difficult entry barriers, these industries, of course, easily earn profits with less competition. Third, corporate governance and operational efficiency of the remaining SOEs were advanced through share-holding reforms and by public listing. Stricter audits and supervision from public investors, and more efficient information, also contributed to these improvements. However, compared with non-SOEs, the profitability of SOEs remains low.

Between 1999, which is the first year that data is available, and 2009, the Return on Total Assets ratio (ROA) of SOEs nearly doubled, which is the same timeframe as non-SOEs (see Table 5.2). Prior to 2007, the SOEs' profitability was able to match that of the non-SOEs, as is shown in this table. In 2007, the ROA for SOEs reached its peak of 12.41%, while the ROA for Hong Kong-, Macao-, and Taiwan-funded enterprises was 13.04%; foreign- invested enterprises was 11.77%; and joint-ownership enterprises was 12.71%. This certainly indicates that the profitability of SOEs was nearly the same for foreign-funded enterprises, which are commonly considered the most efficient institutions. However, convergence in profitability did not continue after 2007, which may be a result of SOEs' expanding assets and overinvesting, because of the central government's 4 trillion CNY stimulus package in 2008. However, some of the collective-owned, joint ownership, and share-holding enterprises are still under central or local government ownership. State-controlled share-holding enterprises, for example, have better financial performances than other SOEs because

they are publicly listed. Table 5.2 reflects the lowest end of SOEs' profitability because some of the better performing state-controlled firms are classified into other categories, based on official statistical standards.

Table 5.2 Return on Total Assets ratio (ROA) and Profits to Cost Ratio (POC) of Chinese Industrial Enterprises with different ownership structure, 1999–2010

	State-owned		Collective-owned		Cooperative		Joint Ownership		Limited Liability Corporations		Share-holding		Private		Hong Kong, Macao, Taiwan funded		Foreign funded	
	ROA, %	POC, %	ROA, %	POC, %	ROA, %	POC, %	ROA, %	POC, %	ROA, %	POC, %	ROA, %	POC, %	ROA, %	POC, %	ROA, %	POC, %	ROA, %	POC, %
1999	6.57	1.76	10.39	3.93			6.67	1.43			8.84	8.20	12.36	4.40	7.34	4.03	8.46	4.71
2000	7.24	3.48	10.98	4.39			8.50	4.48			14.41	14.88	11.33	4.17	8.89	5.62	10.52	6.37
2001	6.75	2.51	10.93	4.17	11.64	4.60	9.52	5.73	7.17	4.52	12.85	11.77	12.04	4.10	8.68	5.15	10.74	6.39
2002	7.67	3.01	11.77	4.97	11.73	5.02	9.52	5.50	7.40	4.57	12.59	11.26	12.20	4.30	9.35	5.77	11.30	6.86
2003	8.44	3.70	12.76	5.42	11.54	5.01	10.21	5.14	8.36	5.41	14.65	12.36	12.24	4.59	9.68	5.87	12.71	7.43
2004	9.18	4.80	12.48	5.57	10.64	5.04	10.51	5.51	12.22	7.21	15.09	10.64	15.44	4.48	10.96	5.74	14.01	6.65
2005	10.86	7.23	16.80	6.23	12.55	5.07	10.13	5.31	11.75	7.80	13.26	8.09	13.85	4.93	9.71	5.36	11.05	5.70
2006	11.32	7.09	17.50	6.39	13.50	5.25	11.93	6.52	12.42	8.25	15.01	9.21	14.95	5.27	10.97	5.82	11.83	5.80
2007	12.41	8.11	19.47	7.06	14.72	6.14	12.71	7.74	13.58	8.73	16.46	10.33	17.18	6.08	11.77	6.55	13.04	6.41
2008	11.30	5.83	21.43	7.66	16.03	6.59	9.90	3.62	13.03	7.23	13.08	7.11	19.67	6.87	12.81	6.33	12.60	5.81
2009	10.23	4.54	21.21	7.34	19.03	7.51	7.68	4.74	11.40	6.77	14.44	9.16	18.33	6.71	12.10	7.24	13.63	7.26
2010	11.88	6.07	22.72	8.51	19.64	9.41	10.09	6.12	13.47	8.18	17.00	10.97	20.82	7.92	14.35	8.52	15.74	8.70

Source: China Industry Economy Statistical Yearbook (various issues); China Economic Census Yearbook (2004). ROA and POC for Cooperative Enterprises and Limited Liability Corporations are not available 1999–2000. Since 2001, the data covers all industrial enterprises earning revenue above a designated amount, defined as more than 500 million CNY per annum. For 1999–2000, the data covered non-SOEs earning above this designated amount and all SOEs.

Bai, Li, and Wang, (1997) explained that the relatively low profitability of SOEs could be because of residual developmental objectives. Although the main SOE reforms have been market-oriented, market-supplanting elements in the SOEs still exist, which means that profit-making has never been a primary target. For example, social development is still considered a task of the SOEs; before the creation of a more functional social security system, SOEs were acting as the alternative to state finance in order to provide retirement benefits, housing, and medical care benefits to their employees (Hu, 1996, pp. 126–129; Bai et al., 2000). It was believed that SOEs could be treated as the "primary social safety net" in China (Laurenceson & Chai, 2003, p. 57).

Additionally, the social costs of economic reforms have always been paid by the SOEs, not the state. In the early reform years, to retain the employment rate for national security reasons, profit-losing SOEs that would not survive under market competition were kept open anyway. This created a domino effect because the only way these insolvent enterprises could stay in business was to continuously borrow from the SOBs, which first generated a large volume of NPLs and then encumbered the performance of the SOBs for many years to come.

Third, throughout all the reform phases, the income tax rate for SOEs was set higher than non-SOEs. To stimulate economic development and encourage foreign investment, foreign-funded enterprises and firms based in six special economic zones[18] enjoyed favorable income tax rates. Tax preferences were also given to non-SOEs several times during the reform periods. By comparing pretax profit rates among different types of industrial enterprises, Lo and Zhang (2011, p. 48) illustrated that from 1978 to 2007, SOEs were sharing nearly the same pretax profit rates as the average of all industrial

[18] The special economic zones are Shenzhen, Guangdong; Zhuhai, Guangdong; Shantou, Guangdong; Xiamen, Fujian; Hainan Island; and Pudong, Shanghai.

enterprises. The tax burden of SOEs, however, implies a transfer from SOEs' profits to state revenue. If the state sector is treated as a whole, there is no significant difference for such a transfer, but it does significantly affect the balance sheets of particular SOEs.

Fourth, the remaining SOEs are in industries with high entry barriers, mostly because these industries require intense capital investment or specific technology needs. The significant initial capital and the cost of technology, which would lower down of the returns on capital per capita, keeps many companies from entering these industries.

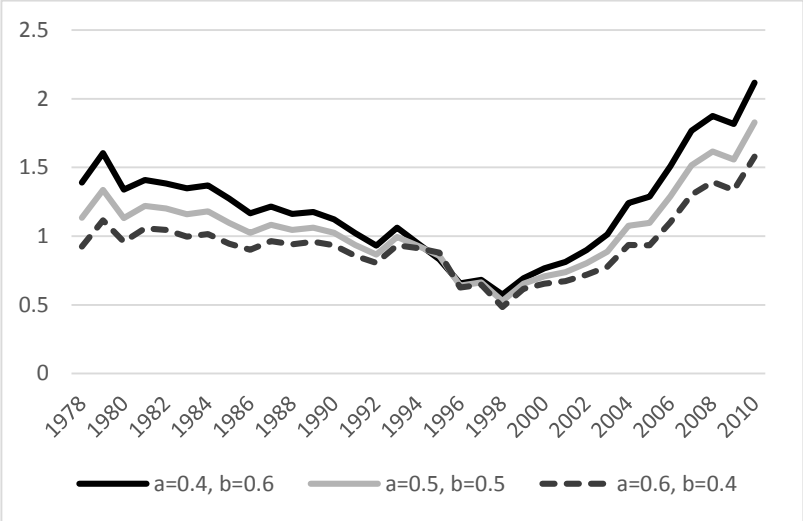
A fifth argument was raised by Laurenceson and Chai (2003, p. 34): the relative low profitability of SOEs is caused by the deterioration of the terms of trade. In adopting the theoretical framework developed by Waters (1997), Laurenceson and Chai split the change of industries' profitability into TFP (total factor productivity) and TPP (total price performance). TPP is defined as the change in the price of firms' outputs relative to the price for inputs; in other words, the change in the terms of trade. In Laurenceson and Chai's study, an overall upward trend of industrial SOEs' TFP growth was captured, while the TPP showed a downward trend, with an average rate of 3.02% per year over the study's time period of 1980 to 1997. Therefore, the SOEs' profitability growth can be explained by the improvement in TFP. Meanwhile, the deterioration of the terms of trade contributed negatively to profitability growth.

This not only points to the potential reasons behind the SOEs' relatively low profitability in comparison with non-SOEs, but also suggest that a pure commercial criteria-based comparison of SOEs to non-SOEs may be biased, given the SOEs' developmental objectives of the state.

5.2.2 Productivity and output growth

Despite concerns about the profitability of SOEs, the situation appears a little different when reviewing productivity or output growth. Most mainstream studies found that the SOEs' TFP went from negative to positive during reform periods, though average TFP was still lower than that of non-SOEs (Dollar, 1990; Jefferson, Rawski, & Zheng, 1992, 1995; Lin, Cai, & Li, 2001, p. 64). The same argument held in a recent firm-level study by Liu and Cao (2011), which focused on SOEs' productivity since the ownership structure reform of SOEs in the late 1990s. Liu and Cao found that although SOEs had a higher growth rate in TFP, their average remained lower than that of non-SOEs. Interestingly, they also documented a higher growth rate of SOEs' labor productivity, and starting in 2004, the average labor productivity of SOEs began to exceed that of non-SOEs. It is worth noting that TFP cannot be observed directly. Different production functions and different price indices largely affect final results. Using a Cobb-Douglas production function and the net value of fixed assets as capital input, Lo (2014) found that the relative TFP of industrial SOEs to non-SOEs was quickly restored, and exceeded non-SOEs after the 1998 reform of SOEs, even when elasticity of capital and labor input were not fixed (see Figure 5.2).

Figure 5.2 Relative TFP of industrial SOEs to non-SOES, 1978–2010



Source: Lo (2014). TFP is estimated by $\text{TFP} = \text{Y}/K^{a}L^{b}$, where Y is total output; K the net value of fixed assets; L the labor employment; and a and b are the output elasticity of capital and labor.

Highlighting the concept of productive efficiency from the tradition of post-Keynesian and neo-Schumpeterian theories (the importance of technological progress and increasing returns in economic growth), Lo and Li (2011) found more efficient delivery, from labor productivity growth to output growth in SOEs, in comparison with non-SOEs. They argued that as long-term-oriented institutions, market-supplanting elements strengthen SOEs' abilities to generate productive efficiencies. However, this means losing allocative efficiencies because of inflexible short-term adjustments.

Table 5.3 records the Industrial Value-Added (IVA) rate by types of industrial enterprises. According to its definition, the IVA rate reflects the ratio of industrial-added value, a direct contributor to GDP, over the total industrial output value. In the table, the SOEs share the highest IVA rate, an average of 34.5% in all sample years, which implies an efficient vertical integration of SOEs and that all SOE output contributed to the GDP.

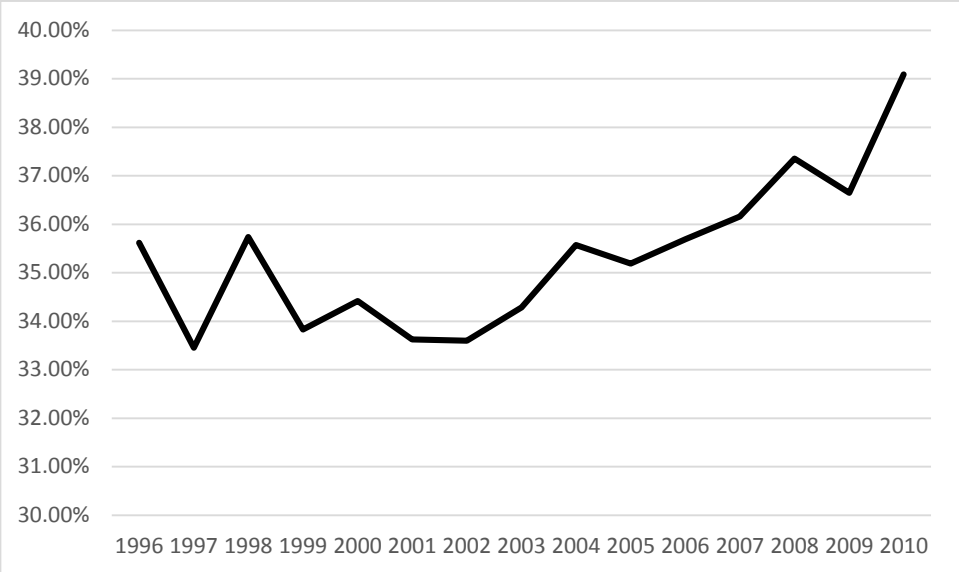
Table 5.3 IVA of Chinese Industrial Enterprises with different ownership structure, select years 1994 to 2007

Year	State-owned	Collective-owned	Cooperative	Joint ownership	Limited Liability Corporations	Share-holding	Private	Hong Kong, Macao, Taiwan funded	Foreign-funded
1994	31.24	26.04		23.73		28.90	30.61	23.38	26.78
1997	33.00	26.58		24.88		28.99	29.36	24.27	25.68
2000	35.78	25.79	25.22	28.07	28.93	35.52	25.26	27.31	24.84
2003	38.72	26.98	26.41	29.77	29.76	34.43	25.64	26.86	25.69
2006	33.72	28.77	27.15	34.22	31.69	29.44	27.86	26.41	25.07

Source: China Industry Economy Statistical Yearbook (various issues). IVA rate is defined as industrial-added value over gross industrial output value.

The comparison of the relative share of total IVAs of SOEs over total IVA is shown in Figure 5.3. Since the reforms in late 1990s, the SOEs' share in total IVA has fluctuated between 33% and 36%. Starting in 2000, SOEs' share in total IVA gradually grew until 2010, when nearly 40% of total IVA was due to SOEs. The increasing contribution to the GDP made from SOEs can be seen as a reflection of SOEs' specific property as long-term-oriented institutions that focus more on development than profits (Lo & Li, 2011).

Figure 5.3 SOEs' share in total IVA, 1996–2010



Source: China Industry Economy Statistical Yearbook (various issues); China Statistic Yearbook (2012).

5.2.3 Summary

All the factors discussed in this section have focused on the same issue: using the financial criteria of Western modern enterprises, including, profitability, does not reflect the complete performance of SOEs. Since the reforms, SOEs' profitability has largely improved—though it is still low when compared with with non-SOEs—and has enjoyed substantial productivity and output growth. The importance and position of SOEs in

China's industrial sector has even been strengthened. By linking SOEs' financial performances and their increasing share in total IVA, it certainly appears that SOEs are out-competed by non-SOEs, according to certain financial criteria. However, the SOEs have shown their advantage and strength in delivering development and contributing to economic development. It is important to remember that profitability was never a primary target for the SOEs, and several market-oriented reforms were directed for their survival and viability. Marketization was never the final target, but always the method.

From the perspective of the banking system, SOEs are now enterprises that can meet a certain level of profit, with enhanced productivity, and that contribute significantly to China's economic development. This is considerably different from the insolvency of SOEs in pre-2000. One major feature of SOEs has remained: they are still directly or indirectly guaranteed by different sectors of the state, which means that the risk of loan default is nearly zero.

Banks' lending to SOEs or non-SOEs became a choice between making low risk and low return or high risk and high return loans. It is not to say that state intervention in bank lending has been totally removed, and SOBs may still prefer to lend to SOEs. But as discussed in Chapter 3, in 2010, 60% of total bank credit was extended by SOBs, while more than 70% of total bank credit was to non-SOEs. The 10% gap, therefore, can be seen as non-SOBs lending to SOEs. If the presumption is that non-SOEs are more market-conforming than SOEs, then why lend to SOEs rather than enterprises with better financial performances? By considering both profitability and risks, an answer can be drawn. Both SOBs and non-SOBs face trade-offs between returns and risks, and while it can be argued that state intervention in lending still exists, it is also fair to say that most SOB lending now takes all factors into account, such as enterprises'

financial condition and risks. It is unreasonable to presume that all SOB lending to SOEs violated market principles, when it could simply be the inefficiency of SOBs.

5.3 SOBs and non-SOBs

If the assumption holds that SOBs are less efficient in resource allocation than other banking institutions, it follows that there's deviation in lending practices between SOBs and non-SOBs. These deviations may be reflected in several banking performance benchmarks: higher capital adequacy ratios (CAR), lower NPL ratios, and higher profitability of non-SOBs. However, if the SOBs and non-SOBs showed a convergence during the reforming years, especially after institutional liberalization and commercialization became central for financial reform, it thus can be argued that the differences in SOB and non-SOB lending behaviors diminished.

The establishment of the China Banking Regulatory Commission (CBRC) as the banking regulatory authority in 2003 solidified the regulatory framework. Along with the request to make annual reports available to the public (reports that were previously only internal), commercial banks were also asked to include information on their operational performances, financial conditions, and risk diversification. For example, given the NPL issue at the end of 20th century, all banking institutions were requested by the CBRC to report details on their NPL stock on a seasonal basis, after the introduction of international compatible NPL classification standards in the early 2000s. Since then, additional performance and risk indicators that concern asset quality, liquidity, and profitability have been added to CBRC's regulation requirements. Finally, public listing the SOBs can be seen as increasing their competitiveness.

Introducing and reinforcing banking industry competition are tools used by the state to improve SOBs performances to better match those of non-SOBs. Intra-industry competition through the adoption of international standards of banking supervision and regulation also lead to comparability between SOBs and non-SOBs. However, SOBs still follow developmental attributes, not simply commercial objectives (Lo et al., 2011, p. 268). This makes an assessment based only on commercial criteria still biased.

In the following sections, the comparison between SOBs and non-SOBs focuses on a capital adequacy ratio, the NPL ratio, and financial performances.

5.3.1 Capital adequacy ratio

5.3.1.1 The banking sector

The concept of a capital adequacy ratio (CAR) in China was first raised in the Commercial Banking Law in 1995, which set a minimal of 8% as the required CAR for commercial banking, with reference to Basel I. At that time, however, articles from the Commercial Banking Law were significant only on paper, not in practice. It was not until the establishment of the CBRC in 2003, and the publication of its article, titled “Regulation governing capital adequacy of commercial banks” in 2004, that the requirement of minimum CAR became an enforced banking practice. Even so, detailed CAR for the banking industry was not publicly available for several years. The concern from the state was that a weak CAR could harm public confidence in the Chinese financial system.

The compromises the CBRC made to make CAR look better is shown in Table 5.4. In

2003, the first year that CAR regulation took place, only 8 out of 194 commercial banks, with a share of lower than 1% of total banking assets, met the minimum CAR requirement of 8%. With the help of government recapitalization and public listing, the injection of new and healthier assets in the banking sector largely improved asset quality across banks. It took only five years, from 2003 to 2008, for nearly all commercial banks to meet the legal CAR requirement.

Table 5.4 Capital adequacy ratio of commercial banks

Year	# of institutions meeting 8% CAR requirement	Share in total banking assets, %
2003	8	0.60
2004	30	47.5
2005	53	75.1
2006	100	77.4
2007	161	79.0
2008	204	99.9
2009	239	100
2010	281	100
2011	390	100
2012	509	100

Source: CBRC (various issues). Only SOBs, JSCBs, CCBs, RCBs, and foreign banks are included here.

However, it can be argued that the actual change in asset quality of domestic banking institutions was even severe and faster than what is presented in Table 5.4. At first, foreign banks were included in constructing the official CAR data, while banking institutions such as the Urban Credit Co-operatives (UCCs) and Rural Credit Co-operatives (RCCs) were not. It is reasonable to deduce that if the 64 foreign banks were not included, in the first few years the number of qualified institutions was lower. Furthermore, after the PBOC made its own CAR calculation formula in 1996 according to Basel I, how it estimated CAR, such as the weight of various risks and the definition of net capital, was modified several times because of the principle of prudential

regulation. For example, the 2004s CAR, based on the 2004 CBRC article mentioned above, reported lower net capital than that of previous versions; in an extreme case, the affect of the 2004s CAR calculating methods was more than 30% (Jing, Li, & Chen, 2004, p. 18). The CAR formula has been revised several more times with the introduction of Basel II and Basel III, making the requirement for banks to meet a minimum of 8% CAR more difficult. For each bank, even though the CAR has remained the same across years, it would imply a higher capital quality in recent years than previous years, of the bank.

It was only in 2008, after nearly all commercial banks met the official CAR requirement that the CBRC began to report the actual numbers of the weighted average CAR on a seasonal basis and that government officials began to talk about the CAR of earlier years. It was not until a 2010 speech made by the-then president of CBRC, Liu Mingkang, that it was announced that the weighted average CAR for all commercial banks at the end of 2003 was -2.98% (Mingkang, 2010).

5.3.1.2 CAR for different types of banks, according to ownership structure

The historical weighted average CARs were not systematically released by the state. It was with publication of the CBRC's first annual report that the CAR for the banking system as a whole became available. Table 5.5 includes the weighted average CAR from 1995 to 2012 for all different types of banks, collected from official sources available to the public. However, it is hard to identify which type of banks held a better position in terms of the quality of assets.

What is known is that because CAR was labeled as a key financial regulation indicator

by the state in the early 2000s, the CAR for banks has been raised substantially. For the four SOBs, their CAR remained around 3% to 4% through the end of 20th century, and then increased rapidly when recapitalization and public listing occurred in the first half of 2000s. A rough comparison is possible by focusing on the years between 2003 and 2005.

Although the data for 2003 is not available, in 2004 the CAR for the SOBs increased by 2.62%, and again by 6.17% in 2005. This means that SOBs' CAR in 2005 was higher than 8.79%. However at the same time, the CAR for joint-stock commercial banks (JSCBs) and city commercial banks (CCBs), which were usually assumed to be more market-conforming than SOBs, were 7.42% and 5.13%, respectively, meaning that they were 1% to 3% lower than that of the SOBs. Furthermore, even for the year 2003, with -2.98% representing the CAR for China's banking system as a whole, a positive (albeit, unknown) CAR for the SOBs suggests that their asset quality and capacity to prevent risks exceeded the average level of the banking sector, from the aspect of CAR.

Table 5.5 Capital adequacy ratio for the Chinese banking system, 1995–2012, %

Year	Commercial banks (all)	Major Banks*	SOBs	JSCBs	CCBs	Rural financial institutions**	Rural commercial banks	Rural cooperative banks
1995			4					
1996			3					
1997			3					
1998			5					
1999			4					
2000			5					
2001			5.07					
2002			4.27				8	
2003	-2.98	X	Y	2.87		＜ 0%	7	
2004		X+2.87	Y+2.62	6.59	4.94	negative to positive		
2005			Y+8.79	7.42	5.13	10.03		
2006					8.48		8.58	13.69
2007	8.4							
2008	12							
2009	11.4 (core CAR 9.2)							
2010	12.2 (core CAR 10.1)							
2011	12.7 (core CAR 10.2)							
2012	13.25 (core CAR 10.62)							

Source: Almanac of China's Finance and Banking (various issues); CBRC Annual report, (various issues); Liu (2010). *Major banks: SOBs and major JSCBs: Bank of Communication, CITIC Bank, China Everbright Bank, Huaxia Bank, China Minsheng Bank, China Merchants Bank, Shanghai Pudong Development Bank, Guangdong Development Bank, Shenzhen Development Bank, Industrial Bank, Evergrowing Bank, and China Zheshang Bank. ** Rural financial institutions: rural credit cooperatives, rural commercial banks, and rural cooperative banks.

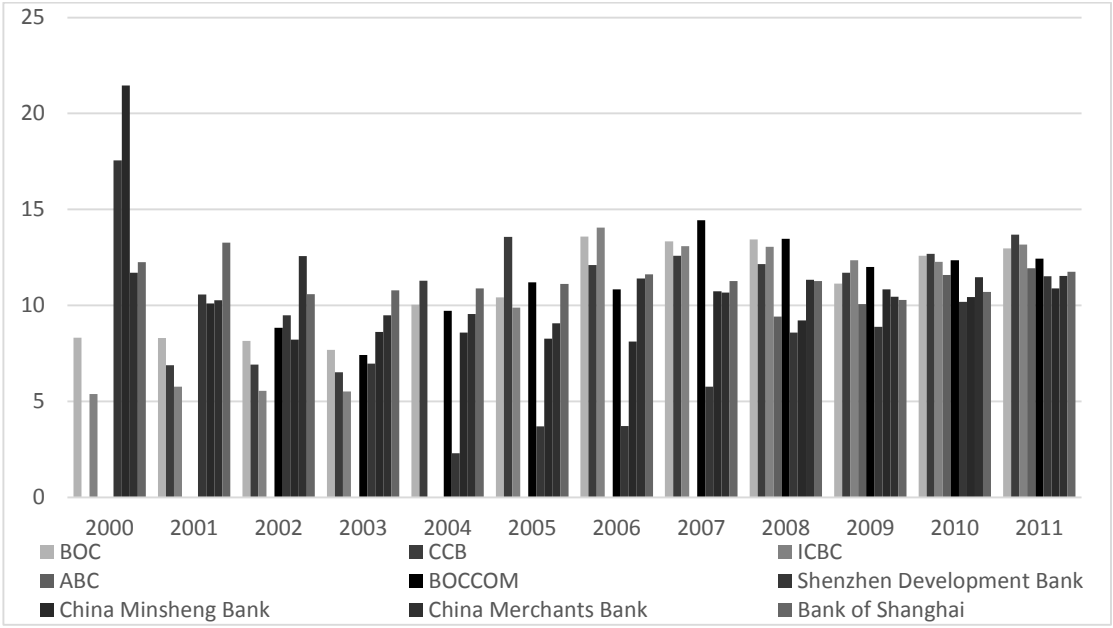
5.3.1.3 CAR for individual banks

Since the CBRS required that commercial banks report CAR in their financial reports, it is possible to compare the changing CARs for particular banks, though data for pre-2000 years is not available.

Along with listing the CARs for the SOBs, CARs for Bank of Communication (BOCOM), Shenzhen Development Bank (Shenzhen), China Minsheng Bank (Minsheng), and China Merchants Bank (Merchants) are jointly presented here in order to make a clear comparison between SOBs and JSCBs. It should be noted that the banks listed here by name are widely regarded as the backbone of China's JSCBs. The moving trend of Bank of Shanghai is given as well, as a representative of the CCBs. Detailed data of CAR for each bank between 2000 and 2011 can be found in Table 5.11 at the end of this chapter.

In the first three years (2000 through 2002) that consistent data is available, commercial banks sharing the highest CARs were Minsheng, Shenzhen, Merchants, and Shanghai, with an average ratio of more than 10%. The SOBs, however, were among the bottom, as none met the 8% requirement. For the year 2000, BOC, the highest performing SOB, was nearly half that of the Shanghai and Merchants, which were sharing third and fourth place, respectively, in that year. It is quite clear that at the start of the new century, the JSCBs shared an average higher CAR than SOBs, which suggests a better position in asset quality and risk amelioration for the JSCBs (see Figure 5.4).

Figure 5.4 CAR for selected banks, 2000–2011, %



Source: GTA Data Online (2014).

A change occurred in 2005, when share-holding reform for SOBs (except for Agriculture Bank of China (ABC) was completed. With the help from the state in writing off historical NPLs, the SOBs were reshaped into modern share-holding companies, and the pressure from ongoing reforms on public listing enhanced their internal efficiency. As seen inn Figure 5.4, by the end of 2005, the CAR ratio for SOBs began to exceed that of JSCBs. At the same time, only Bank of Shanghai, the representative of the CCBs, reported a CAR of more than 10%. The top ranking banks in these early years (Shenzhen, Minsheng, and Merchants) all recorded lower CARs than the SOBs. In an extreme example, Shenzhen reported a CAR of 3.7%, less than one-third of that of the China Construction Bank, the SOB which record the highest CAR in 2005.

After 2005, although the CAR for different banks fluctuated, a convergence trend occurred, especially after 2009. SOBs maintained their CAR advantage over the second half of the 2000s, and the JSCBs' CAR improved. By the end of 2011, the top five

CARs were shared by the four SOBs and BOCOM (a former JSCB that was officially reclassified as an SOB in 2007).

5.3.1.4 Summary

Due to the data availability issues, summarizing the comparison of capital adequacy ratio among Chinese banking banks is difficult, particularly identifying the relative differences between SOBs and more market-conforming banks (i.e., JSCBs and CCBs) pre-2000. What is clear is that pre-2000, very few banks could meet the requirement of a minimum 8% CAR set in the Commercial Banking Law. The only available data, weight-averaged CARs for the major SOBs, fluctuated between 3% and 5%. Circumstance changed in the 21st century. In only five years, from 2003 to 2008, the share of total banking sector assets that met the 8% requirement increased dramatically from less than 1% to nearly 100%. Since 2005, the capital adequacy condition for SOBs, began to surpass the banking sector average and outperform the JSCBs.

The reasons behind the success of the SOBs' CAR is related to public listing reforms. Although some market-supplanting elements remain, the establishment of modern share-holding companies within the SOBs, combined with several events, such as introducing internationally comparable management structures and foreign strategic investors, have imposed strong market-conforming factors into the SOBs. Market competition between SOBs and other banks has further accelerated the process. In analyzing the changing CARs among commercial banks, it can be seen that there are no longer any differences in CARs between the SOBs and JSCBs, as they face the same regulation requirements and are under the supervision of the same regulatory body, the CBRC.

On the one hand, the SOBs are endorsed by the state, which implies that JSCBs must consider risks more prudentially than SOBs. One the other hand, a higher CAR for SOBs implies SOB improvement from various aspects, such as risk control, corporate governance, and operational strategies.

5.3.2 Nonperforming loans (NPLs)

5.3.2.1 NPL ratio of the banking sector as a whole

NPLs created serious problem in the banking sector by the end of 20th century, as argued in previous chapters. Most of the NPLs generated before 2000 are due to SOBs' lending to insolvent SOEs, as also discussed in earlier chapters. Therefore, through the *Zhua Da Fang Xiao* reform, SOEs were no longer required to play multiple roles, but operate more on market principles. SOBs were also no longer requested, or even required, to lend to unprofitable SOEs under local government pressure. This also means that SOBs gained autonomy in their lending decision-making processes, though their loans to SOEs were still a large stake in their loans portfolios However, they could choose to lend to more profitable SOEs, or SOEs with better financial standing (Laurenceson & Chai, 2003, p. 54).

As mentioned in Chapter 3, before 2004, the NPL classification standard applied in China's banking system was a four-tier standard, rather than the internationally comparable five-tier standard. According to the four-tier standard, loans are classified as performing, overdue, doubtful and unrecoverable, and loans under the last three categories are marked as NPLs. For simplicity, the major differences between the two

classification systems is that the four-tier system marks NPLs according to the age of the loans and overdue days, not the possibility of paying them off, which is the principle in the five-tier system. The change of classification standards resulted in inconsistent historical NPL data for China's banking sector. Although the NPL ratio under the five-tier standard for some individual banks was back-tracked to 2000 by the commercial banks themselves, when considering the banking sector as a whole, 2003 is the first year that consistent NPL data is available. To generate comparable data series, a commonly used research method is to add an additional 5% to the NPL ratio data reported under the four-tier standard (Shi, 2005, p. 28). This is based on the practical experience that between 2001 and 2003 when a trial five-tier NPL classification standard was introduced in SOBs, a 5% difference has been recorded between the two standards.

Table5.6 NPL ratio of Chinese banking system, 2003–2012, %

Year	NPL ratio
2003	17.8
2004	13.21
2005	8.61
2006	7.09
2007	6.17
2008	2.41
2009	1.58
2010	1.14
2011	1
2012	0.95

Source: CBRC (various issues).The NPL ratio in 2003 and 2004 are the ratio for major commercial banks, defined as SOBs plus JSCBs. For the other years, NPLs are for commercial banks as a whole.

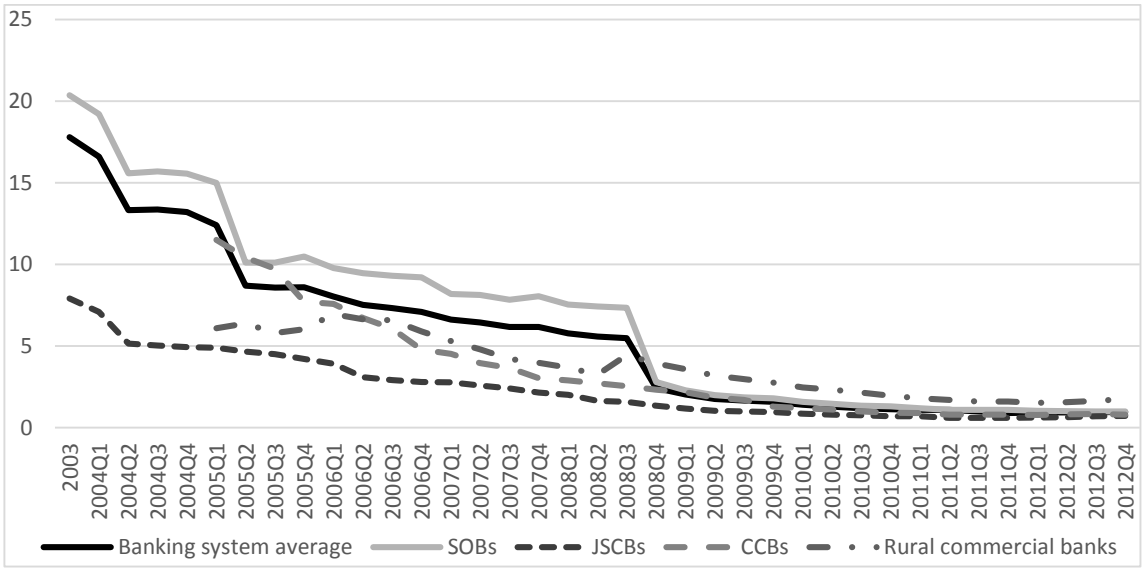
In Table 5.6, it can be seen that the NPL ratio for the banking sector as a whole declined from nearly 18% in 2003 to less than 1% in 2012, which implies a gradual and successful improvement in prudential loans being generated by commercial banks. However, it can be argued that the major motivation for banks was heavy pressure from

the state, along with increased market competition (Cousin, 2011, p. 163), to avoid the serious NPL problems of late 1990s.

The NPLs written-off from SOBs are also reflected in this table. The years with massive NPL deductions, such as 2003–2004, 2004–2005, and 2007–2008, were also the years that the state concentrated on writing off the SOBs' NPLs (see also Table 3.7).

5.3.2.2 NPL ratio for different types of banks, according to ownership structure

Figure 5.5 NPL ratio for Chinese banking system, classified by ownership type, 2003–2012, %



Source: CBRC (2014). The NPL ratio in 2003 and 2004 is the ratio for major commercial banks, defined as SOBs plus JSCBs. For the other years, NPLs are for commercial banks as a whole. Before 2007, BOCOM was classified as a JSCB but is now an SOB.

By breaking down the banking industry's NPL data according to types of banks, the evolution of NPLs can be understood (detailed NPL data for each bank from 2000 to 2011 can be founded in Table 5.12). SOBs shared a higher-than-average NPL ratio; although moving in same direction, a substantial 2% to 3% gap between SOBs and commercial banks occurred until the end of 2008 (see Figure 5.5).

Between 2003 and 2008, as seen in changing slope of the curve, it is obvious that there were three sharp declines of the SOBs' NPL ratio — Q2 2004, Q2 2005, and Q4 2008 — which were caused by the NPLs being written-off by the state. Between 2003 and 2008, for example, from Q4 2005 to Q3 2008, a smoother yet still downward NPL ratio change occurred, which can be regarded as the SOBs' increased ability to process NPLs. For the same periods, the slope for JSCBs is parallel with the SOBs, which may suggest that, despite the remaining high stock of historical NPLs, SOBs had similar capability and efficiency in handling NPLs as the JSCBs.

After four major waves of administrative-level write-offs by the state, in 2009 the NPL ratio for SOBs, for the first time, approached the average level, with a ratio of 2%. The trend has continued, and as seen in Figure 5.5, the NPL ratio for all banks, except rural banks, became similar in 2011 and 2012,

For the JSCBs and CCBs, neither enjoyed administrative level support, such as NPL write-offs.[19] The CCBs, however, have shown better capability in dealing with NPLs, reflected in the sharper slope in Figure 5.5. JSCBs started from a better position, with few historical NPLs. For 2005, when detailed NPL data for CCBs first became available, the NLP ratio for CCBs was kept around 10%, which was similar to SOBs but twice the JSCBs. Thereafter, the gap narrowed gradually and in 2011 and 2012, the difference became hard to identify.

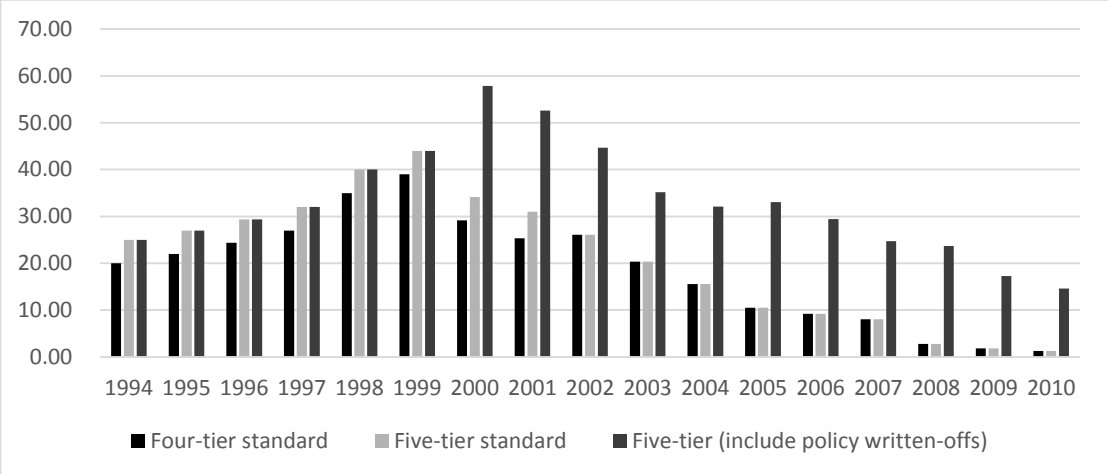
5.3.2.3 Effects of NPL write-offs

The analysis above shows that the several waves of NLP write-offs by the state were

[19] While NPL writes-off did not occur, capital injection did.

vital for SOBs to lower their NPL ratio, and were key for the SOBs to attain the NPL average in less than 10 years. By restoring the stock of written-off SOB NPLs into the data of total book-value NPLs, and then dividing by the total bank loans, the direct effects of policy write-offs can be seen. As seen in Figure 5.6, if the effects of these write-offs were controlled, the NPL ratio for SOBs in 2010 would have remained at 14.6% (having been reduced from its peak in 2000 of a ratio of nearly 60%). The downward trend of SOBs' NPLs ratio that exclude the write-off effect is prove of the SOBs' capacity to handle the problem of NPLs. Dropping from nearly 60% to less than 15% in 10 years implies that nearly 45% of NPLs were absorbed and handled by the SOBs themselves. Being aware of the accuracy of Chinese banks' official NPLs data before 2003 (see Anderson, 2006; Lardy, 1998, 2000, 2001; Studwell, 2003), what is worth noting is that, the real circumstances of SOBs' NPLs between 1994 and 2003 could be even worse.

Figure 5.6 NPL ratio for SOBs, including effects of policy write-offs, 1994–2010, %



Source: Author's calculations. Almanac of China's Finance and Banking (various issues); CBRC (various issues); CBRC (2014); Shi (2005). The calculation and adjustment of NPL ratio under the four- and five-tier standard between 1994 and 2000 follows Shi (2005).

5.3.2.4 Summary

Although SOBs suffered from high levels of historical NPLs, four waves of administrative support have removed this problem to a large extent. The improved slope of banks' NPL ratio is a reflection of the banks' efficiency in handling NPLs. For periods without concentrated write-offs, the parallel curve between SOBs and JSCBs indicate there were few differences in their capabilities to handle NPLs, though it was suggested that CCBs performed better. When the effects of write-offs is removed, a rapid decline in the SOB's NPL ratio over the course of 10 years suggests that SOBs have shown great effort and capacity to directly handle NLPs.

5.3.3 Financial performance

The comparison of the capital adequacy ratio and nonperforming loans of SOBs and JSCBs, and the discussion on the banking sector averages, were from the perspectives of soundness and solvency of commercial banks. The analysis clearly indicates that, from these two perspectives, the differences among SOBs and other banks have lessened across the reforming periods. It is fair to say that SOBs now operate as commercial banks. Given the importance of SOBs in China's banking sector and the entire economy, SOBs and the state authority concentrated more on prudential operations and risk management.

In reviewing financial performances, the comparison between SOBs and other commercial banks provides some useful information. Because financial instruments and financial markets are not developed to a high level in China, especially when compared to advanced economies such as the United States and the United Kingdom, the profit

model for China's banks remains mainly interest rates spread based. That is to say, there is a strong correlation between banks' lending behaviors and their earnings, and more efficient lending creates more profits. If SOBs' lending decision-making processes were not as market-oriented as other Chinese banks; or, in other words, if SOBs were less able to determine efficient use of their lending funds than other banks (i.e., lower allocative efficiency), then they would record weaker financial performances than other banks. Conversely, the same would hold true if SOBs showed little difference from non-SOBs in financial performances. There would be a convergence of the lending behaviors between SOBs and non-SOBs, which would imply no or little difference in allocative efficiency.

5.3.3.1 Total assets

By the end of 2011, the 4 SOBs shared nearly 50% of China's banking market, while the 13 JSCBs and 144 CCBs recorded a market share of only around 20% and 9%, respectively, if measured by total assets (see Table 4.6). The comparison between assets levels is more obvious (year 2011), as the average scale per SOB was nearly 7 times that of the JSCBs and nearly 180 times the CCBs. At the same time, the JSCBS and CCBs enjoyed a faster expansion in assets (see Table 5.7). The asset scale of the SOBs grew at a rate of 14.21% each year (2000 through 2011); while the JSCBs recorded a growth rate in total assets that exceeded 25% during the same time period. Because of data unavailability, the rate for the CCBs is hard to know. The only available CCB information, from the Bank of Shanghai, averaged an annual growth rate of 19% of total assets, which is higher than all four SOBs.

From the aspect of scale expansion of banking assets, the SOBs remain the dominant

players in Chinese banking system; although the JSCBs and CCBs experienced faster expansion in the past few years. Given the size of each SOB as compared to the other banks in China's banking system, the SOBs should remain the dominant players for years to come.

Table 5.7 Average annual growth, assets of Chinese commercial banks, 2000–2011, %

SOBs		**14.21%**
	BOC	12.72%
	CCB	15.44%
	ICBC	13.09%
	ABC	16.46%
JSCBs		**25.33%**
	cBOCOM	19.87%
	Industrial Bank	35.44%
	Guangdong Development Bank	17.99%
	Shanghai Pudong Development Bank	31.62%
	Shenzhen Development Bank	30.51%
	China Minsheng Bank	37.32%
	China Merchants Bank	26.02%
	CITIC Bank	25.14%
	China Everbright Bank	21.29%
	Huaxia Bank	25.78%
CCBs		
	Shanghai Rural Commercial Bank	Unknown
	Bank of Chongqing	Unknown
	Yinzhou Bank	Unknown
	Bank of Beijing	Unknown
	Bank of Shanghai	19.05%

Source: Author's calculation. GTA Data Online (2014).

5.3.3.2 Net profits

When reviewing the net profits of the commercial banks, the situation is quite similar to total assets: SOBs earn the highest, JSBCs the second highest, and CCBs the third highest. As seen in Table 5.8, the average net profits of the SOBs were more than seven times the JSCBs' average. Except for BOCOM and the China Merchants Bank, between 2000 and 2011, the JSCBs did not record average profits of more than 10 billion CNY. In contrast, the average net return for the worst performing SOBs, the ABC, was over

30 billion CNY.

Table 5.8 Average annual net profits and growth rates of Chinese commercial banks, 2000–2011

Type	Bank Name	Average annual net profits (100 million CNY)	Average annual growth (%)
SOBs			**38.28**
	BOC	455.02	34.99
	CCB	628.09	32.69
	ICBC	665.93	39.81
	ABC	300.22	72.81
JSCBs			**39.05**
	BOCOM	163.72	34.02
	Industrial Bank	72.21	68.83
	Guangdong Development Bank	20.54	39.64
	Shanghai Pudong Development Bank	75.28	35.59
	Shenzhen Development Bank	23.72	31.48
	China Minsheng Bank	69.80	46.17
	China Merchants Bank	113.90	42.91
	CITIC Bank	83.43	37.55
	China Everbright Bank	48.86	46.44
	Huaxia Bank	25.36	33.52
CCBs			
	Shanghai Rural Commercial Bank	13.17	
	Bank of Chongqing	6.17	
	Yinzhou Bank	4.33	
	Bank of Beijing	37.67	
	Bank of Shanghai	23.75	19.16

Source: Author's calculation. GTA Data Online (2014). Starting data dates for CCBs: Shanghai Rural Commercial Banks: 2005; Bank of Chongqing: 2004; Yingzhou Bank: 2005: Bank of Beijing: 2003).

There is no doubt that the difference in the size of the institutions affects the differences in net gains. However, in analyzing the growth in net profits, with the exception of the ABC and Industrial Bank, there is little difference between the SOBs and JSCBs in their average annual profit growth (Table 5.8). These two types of banks each had an annual growth of net profits of around 40%. For the CCBs, industrial-level information was

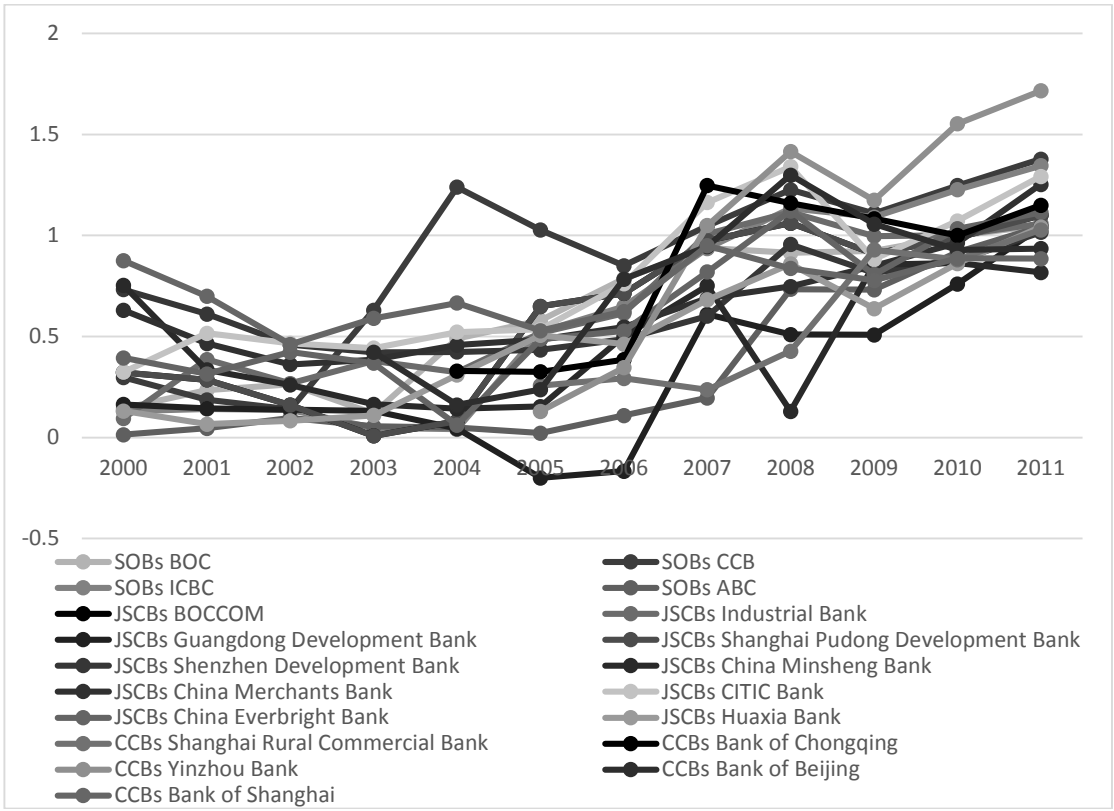
unavailable, which makes it impossible to conduct a comparison. The only available data was from the Bank of Shanghai, which recorded an average annual growth in net gains of 19.16%, which was slightly lower than the SOBs and JSCBs.

5.3.3.3 ROA and ROE

In order to compare the return rates between SOBs and non-SOBs, two financial performance indicators, Return on Assets (ROA) and Return on Equity (ROE) were applied in a comparative analysis. The 4 SOBs, 10 JSCBs, and 5 CCBs were included, and the time period analyzed was 2000 to 2011.

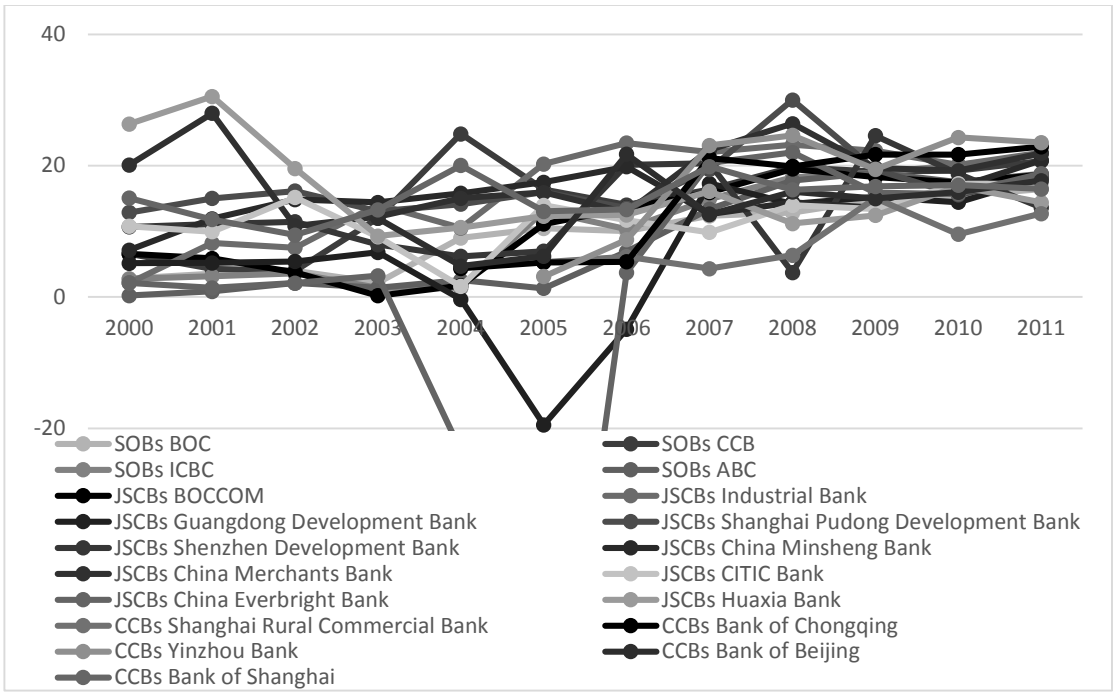
The major change of each bank's ROA and ROE are shown in Figures 5.7 and Figure 5.8 (detailed ROA and ROE data for each bank from 2000 to 2011 can be founded in Table 5.13 and Table 5.14). Generally, an upward trend is captured in both the ROA and ROE, which indicates improved profitability in China's banking system over the past 10 years. The two exceptions, with negative ROA and ROE in particular years, are two JSCBs, the Guangdong Development Bank and the China Everbright Bank. In 2005 and 2006 the Guangdong Development Bank recorded a net loss in its year-end financial report. China Everbright Bank's negative figures were caused by negative shareholders' equity in years 2004 and 2005.

Figure 5.7 ROA for Chinese Commercial Banks, 2000–2011, %



Source: GTA Data Online (2014).

Figure 5.8 ROE for Chinese commercial banks, 2000–2011, %



Source: GTA Data Online (2014).

By adding up net profits, total assets, and shareholders' equity, according to bank ownership types, the ROA and ROE present more details (see Table 5.9). It was not until 2005 that consistent data for the sampled five CCBs became available, therefore the ROA and ROE for CCBs are only reported since 2005. The main comparison analyzed is between the SOBs and JSCBs.

Table 5.9 ROA and ROE comparison between banks with different ownership structure, 2000–2011, %

ROA	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average annual Change (%)
SOBs	0.15	0.16	0.16	0.19	0.41	0.53	0.60	0.80	1.02	0.98	1.11	1.22	21.07
JSCBs	0.35	0.33	0.28	0.24	0.26	0.47	0.55	0.83	0.95	0.82	0.94	1.08	10.95
CCBs						0.35	0.60	0.84	0.99	0.94	0.93	0.97	18.47
ROE	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average annual Change (%)
SOBs	2.93	3.05	3.50	1.33	10.95	12.32	10.95	14.46	17.12	17.93	18.22	19.61	18.86
JSCBs	7.82	8.92	8.41	7.16	11.78	14.51	11.40	16.56	19.26	17.25	17.35	18.82	8.31
CCBs						8.29	13.75	13.89	14.90	15.99	15.37	16.80	12.49

Source: Author’s calculations. GTA Data Online (2014).

Between 2000 and 2003, the JSCBs recorded higher ROA than the SOBs, but the situation changed in 2004, when the ROA for SOBs began to exceed that of JSCBs, with a ratio of 0.41% and 0.26%, respectively. SOBs continued to record better ROA in each of remaining sampling years (except for 2007). Over the period being analyzed, the SOBs improved their ROA with an annual rate of 21.1%, nearly double that of the JSCBs. The CCBs also achieved remarkable change in ROA, with an annual growth rate of 18.5%.

For ROE, the situation is similar: the SOBs started with a lower percentage but then caught up and exceeded the JSCBs. In 2000, ROE for JSCBs was 7.82%, which was nearly three times that of the SOBs, but this disappeared through SOB reforms. By 2011, the average ROE for SOBs was 19.61%, nearly 1% higher than for JSCBs. For selected CCBs, although the ROE improved, with an annual growth rate of about 12.5%, (lower than SOBs but higher than JSCBs), in absolute terms, the CCBs recorded much lower ROEs than either the SOBs or JSCBs.

This information clearly shows that the SOBs experienced profitability improvement. From a neoliberal perspective, non-state owned, market-determined, and more commercialized banks would achieve higher efficiency and better performance in risk control, corporate governance, and higher return rates. However, the SOBs have enjoyed faster growth in profit rates, which is reflected in both higher ROA and ROE as compared to their non-state controlled competitors, the JSCBs and CCBs. If we deconstruct ROA and ROE for the SOBs and JSCBs into separate parts and review their average annual change of net profits, total assets, and shareholder equity over the same time period (see Table 5.10), it is clear that the SOBs' net profits grew slightly slower than the JSCBs, and that the JSCBs experienced faster expansion in total assets and

shareholder equity. Therefore, although the JSCBs enjoyed net profits growth at the same speed as the SOBs, their relative return rates — ROA and ROE — were lower.

Table 5.10 Average annual change in net profits, total assets, and shareholder's equity, 2000-2011, %

Factor	SOBs	JSCBs
Net profits	38.28	39.05
Total assets	14.21	25.33
Shareholder equity	16.34	28.39

Source. Author's calculations.

5.3.4 Summary

The analysis in this section focused on the assumptions made by mainstream finance–growth literature in regards to China's banking system. The assumption is that the inefficiencies in China's financial system are caused by the relative allocative inefficiencies of the SOBs because of continuous lending to SOEs. These assumptions lead to the suggestion that both SOBs and SOEs have relative week performances in comparison to non-state competitors.

By examining the performances of SOEs, non-SOEs, SOBs, and non-SOBs, the solidity of such assumptions have been brought into question. First, through the reform periods, the SOEs experienced significant improvement in their financial performances and contributed greater to overall economic development as long-term oriented institutions. Lending to SOEs then should be economically logical choices for banks, as SOEs have similar performance records as non-SOEs and have lower levels of risks, as loans are directly or indirectly guaranteed by the state. The improvement in SOEs' performances may explain the phenomenon observed in Chapter 4: that non-SOBs also significantly grant loans to state sector.

Second, SOBs have enjoyed remarkable growth and development. In comparison with the JSCBs and CCBs, the differences in risk control and asset quality continue to diminish, and the performance of SOBs have surpassed non-SOBs in recent years. Third, and the most important, is that SOBs have shown improved profitability over the JSCBs, when estimated by ROA and ROE. Therefore, if the neoclassical-style assumption of allocative inefficient SOBs is true, then how can SOBs generate more profits if they are less efficient in lending practices?

Given the problem of data limitation, for non-SOBs, this section mainly emphasizes on JSCBs and CCBs. However, one should notice that although there is no business restrictions among SOBs, JSCBs and CCBs, the expansion policies for these three kinds of banks are somehow different. SOBs and JSCBs are regarded as national-wide banks while CCBs are mainly treated as regional banks. In view of that, the existence of a potential level playing field may affect the performances of different types of banks to certain extent.

Above that, an “inefficient” financial system, based on the assumption of inefficient SOEs and SOBs, is not as weak as expected. Extending funds to SOEs, or the state sector, can now be considered solid economic decisions for commercial banks. Given that the SOBs have now achieved stronger financial performances than non-SOBs, it is no longer reasonable to assume an allocative inefficiency in China’s banking system.

5.4 Dynamic and overall allocative efficiency

Although allocative efficiency cannot be estimated directly, by excavating and reconsidering the intension of allocative efficiency, an assessment of aggregate banking

loans and total investment can provide some insights indirectly.

5.4.1 Deviations in allocative efficiency

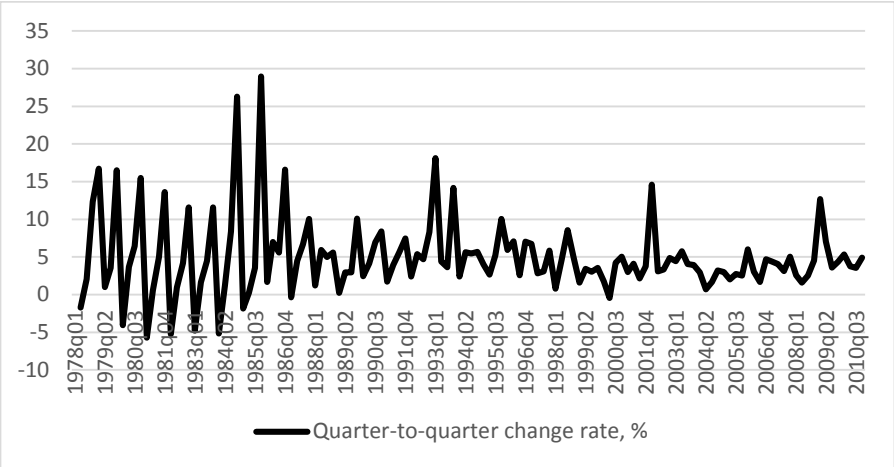
As discussed earlier in this thesis, the definition of allocative efficiency of financial resources implies that in a fully competitive market with no market frictions, all financial resources (such as bank loans) would be channeled to the most productive or profitable low-risk enterprises in order to gain maximum returns. Therefore, there are two situations of allocative inefficiency: (a) supplying bank credit to all firms, no matter their level of efficiency and financial condition; and (b) making it difficult for firms to obtain bank credit, no matter how profitable they are.

It is fair to argue that the above assumption and inference neglect one important dimension: the accessibility to finance of small and medium enterprises in China. However, if we look back to Figure 4.7 and Figure 4.8, a declining share of state sector in loan distribution over the past 30 years would definitely indicate an improvement in credit accessibility of non-SOEs, which, are usually small and medium enterprises. Given so where the accessibility to credits for the private sector has experienced continuously improvement, a deviation from the equilibrium amount of loans extended under ideal conditions, e.g., more severe fluctuations between periodic aggregated bank loans, can be seen as a reflection of allocative inefficiency. In contract, if the fluctuation in credits growth goes from dramatic to gentle, it can be seen as a process of growing allocative efficiency.

5.4.1.1 Overall trend

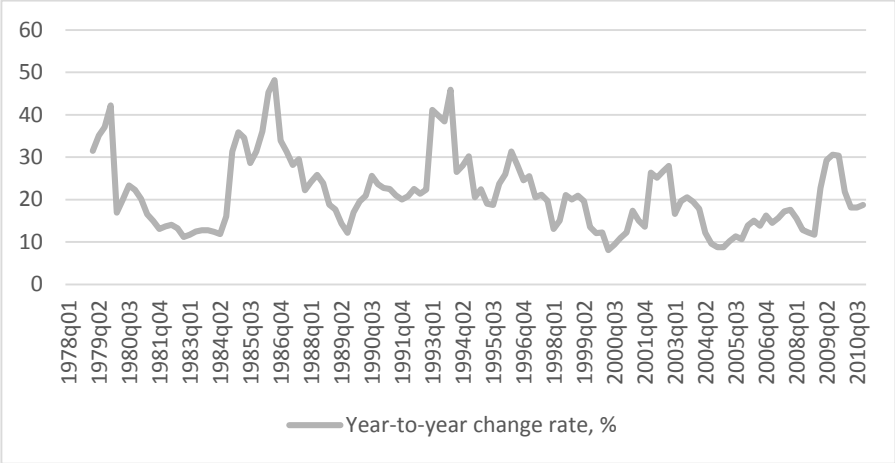
As seen in Figure 5.9, there has been a significant transformation from violent to moderate fluctuations in the percentage of change of domestic credits, both quarter-to-quarter and year-to year basis. The interval of quarter-based change has been reduced from nearly 30% in mid-1980s to around 10% in the past 10 years. For year-to-year (see Figure 5.10), more than 10% growth has been recorded for credit growth in most quarters, and the fluctuation between the peak and bottom has decreased from 40% to 20% between 1978 and 2010. According to the above definition of allocative (in)efficiency, Figure 5.10 indicates that when the banking sector is taken as a whole, there has been a gradual process of allocative efficiency amelioration, as moderate credit growth implies fewer financial resource mismatches from banks to enterprises.

Figure 5.9 Quarter-to-quarter change of domestic credits, 1978–2010, %



Source: Author's calculations. International Monetary Fund (2013).

Figure 5.10. Year-to-year change of domestic credits, 1978-2010, %

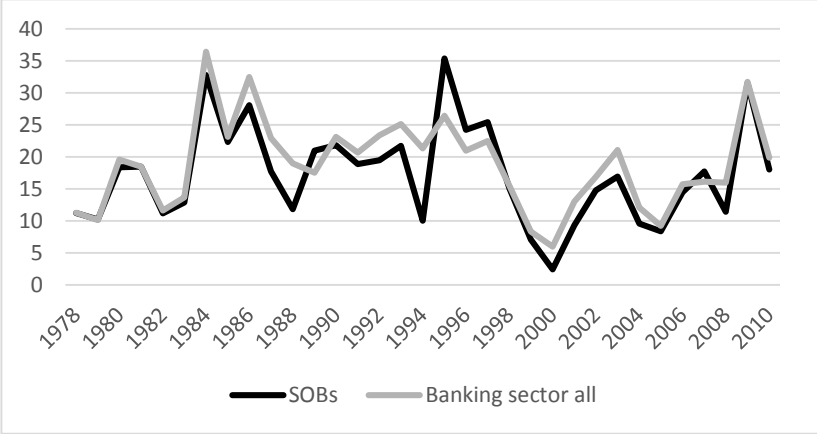


Source: Author's calculations. International Monetary Fund (2013).

5.4.1.2 Comparison according to ownership

In comparing the annual growth of outstanding bank loans between SOBs and the banking sector as a whole, the two curves in Figure 5.11 provide detailed information. In the first phase of financial reform, from the late 1970s to the mid-1980s, when independent SOBs were established, the curves of loan growth of the SOBs and Chinese financial sector move at nearly the same rate. This can be explained because at this early stage of financial reform, there were only three types of banks that comprised the formal financial sector: the PBOC, the SOBs, and the RCCs.

Figure 5.11 Annual growth of bank loans between SOBs and banking sector, 1978–2010, %



Note: Author's calculations. Almanac of China's Finance and Banking (various issues).

However, between the mid-1980s and mid-2000s, banking institutions with different ownership structures were established, and marketization, commercialization, and internationalization in the financial sector was pushed by the state. SOBs' banking credit growth was more volatile than the whole banking system, which suggests lower efficiency in allocating financial resources when compared to the industry's average. Starting in 2005, with reforms on public listing the SOBs nearly complete, and with prudential regulation in financial reforms, a convergence in the growth of bank lending between SOBs and banking sector average can be seen, which can be interpreted as the SOBs improving their allocative efficiency.

To summarize, by defining allocative inefficiency as the deviation from the ideal amount in supplying financial resources, Figures 5.9, Figure 5.10 and Figure 5.11 tell two important things. The first is that since the late 1970s, the fluctuation of domestic credit growth has changed from severe to gentle, which implies less deviation from the ideal amount of credit supply. Second, SOBs also experienced increased allocative efficiency, which is reflected in the convergence of loan growth curves between SOBs and banking sector averages.

5.4.2 Efficiency of investment

A more efficient use of funds provided by banks can be also understood as transferring funds to productive and profitable enterprises. From the aspect of investment, it implies investing bank credit into projects with the highest returns. The return on investment, or the efficiency of investment, therefore, can be used as the proxy to estimate allocative efficiency.

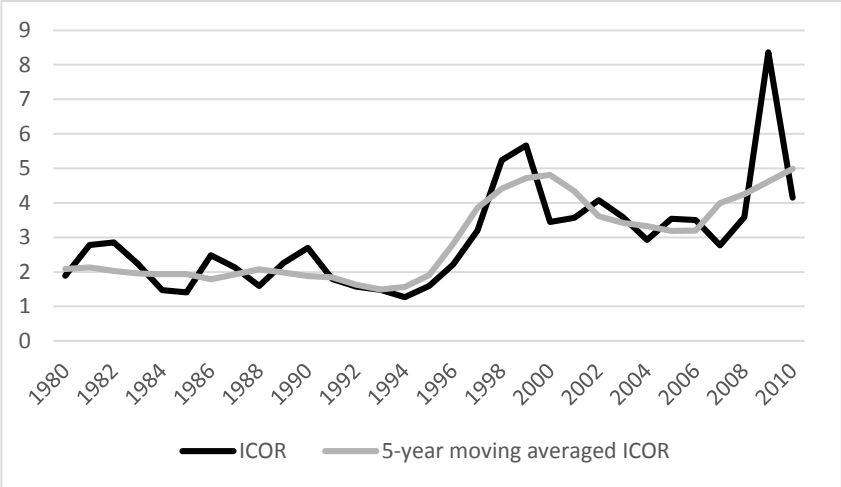
For measuring the efficiency of gross investment, researcher commonly apply the incremental capital-output ratio (ICOR) (see Keidel, 2009; Kwan, 2004, Ren, 2007; Toh & Ng, 2002). ICOR is first defined as the change of capital formation (investment) in one period over the change in output in the subsequent period. The meaning of ICOR is straightforward: it reflects the amount of capital required as to guarantee per unit output growth. In other words, the ICOR shows that for any year, how much additional capital has been donated to productive processes, and at the same time, how much extra output is generated. For example, an ICOR of 5 simply implies that every 5% of GDP invested would result in 1% of GDP growth. The lower the ICOR is, the more efficient the capital is being utilized. According to this definition, ICOR is equivalent to the reciprocal of the marginal product of capital for a certain period (or IOCR, incremental output-capital ratio).

5.4.2.1 Overall trends

From the definition earlier in this section, the ratio of ICOR can be calculated by the equation $\text{ICOR} = \frac{\Delta K}{\Delta Y}$. Applying this formula, the evolution of ICOR for China, which is

based on GDP and total social investment data, is reported in Figure 5.12. In addition, a 5-year moving averaged ICOR is in the same figure, to control for the effects of potential short-term shocks; and two major downward trends and two major upward trends of ICOR have also been captured in Figure 5.12. The downward and upward trends can be seen as reflections of the process of gaining or losing allocative efficiency. By linking economic reform, it is possible to explain the improvement in allocative efficiency.

Figure 5.12 ICOR for Chinese economy, 1980-2010, annual data, and 5-year moving average



Source: Author's calculation. China Statistic Yearbook (2012).

There was a decreasing trend of ICOR from 1980 to 1994 and from 1998 to 2007, which both happened when key SOE reforms were occurring: the price liberalization reform in the early 1980s and *Zhua Da Fang Xiao* reform in the late 1990s. These two reforms promoted market competition and natural elimination through competition, with the result that productivity and financial performances, or in other word, the viability of SOEs, were largely improved. This improvement is key to understanding the increased aggregate investment efficiency.

The two upward trends of increasing ICOR, from 1994 to 1998 and from 2007 and

continuing, are likely related to the pace of reforms in the financial sector. From 1994 onward, fiscal reforms and the establishment of development banks largely removed the quasi-fiscal agency role of the financial sector, allowing the financial sector to pursue more commercial goals. However, the state continued to issue annual credit plan to guide banks' lending behaviors, leading to continuing credit provision to insolvent SOEs. Although SOE ownership reforms had been raised by the state in 1994, nothing happened until the late 1990s, and annual credit plans were not discontinued until 1998. Between 1994 and 1998, when the reforms of the financial sector and SOEs were not at the same pace, huge investment inefficiencies occurred. The reduction in investment efficiency starting in 2007, however, is the side effect of the economic stimulus plan adopted by the central government in 2008 to avoid the global financial crisis and recession. By the end of 2010, 4 trillion CNY have been invested in infrastructure and social welfare.

5.4.2.2 Comparison according to ownership

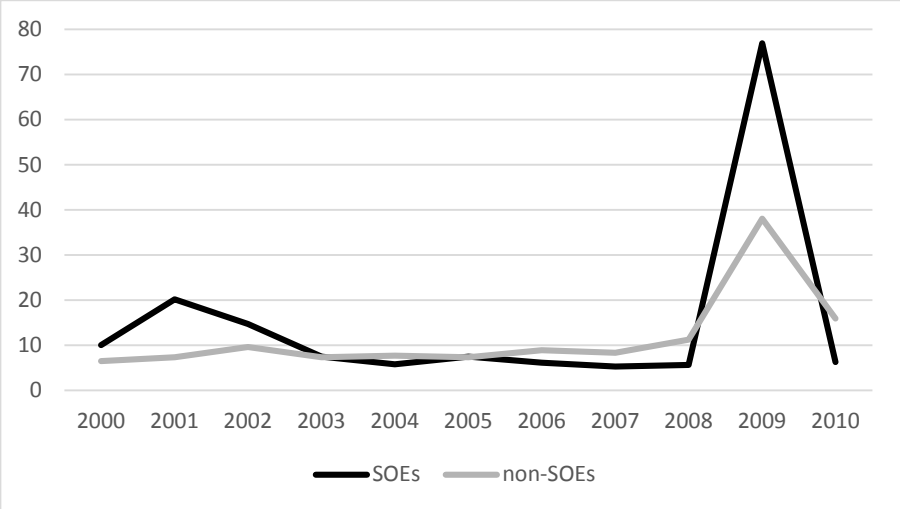
In order to investigate the differences in investment efficiencies between economies with different ownership structure, this thesis follows Zhang, J. (2003, 2005), who used industrial sector data (that is, IVA data and data of fixed investment by ownership) to calculate the relative ICOR for state and non-state economies. Due to the change in statistical standards, detailed IVA data that classifies ownership structure is not comparable before 1998. Therefore, the focus in this section is 2000 and onward, when a second wave of investment efficiency improvement occurred (see Figure 5.12).

Starting in 2000, the state-owned industrial sector experienced a gradual decreasing trend until 2007, when the curve began to raise again; in contrast, the ICOR for

non-state industrial sector has increased gradually over the years (Figure 5.13). In 2003, there was a turning point when the ICOR from the state sector was lower than that of the non-state sector. A lower ICOR implies higher marginal products of capital, i.e., a higher return on capital. Starting in 2003, industrial SOEs were becoming more efficient in their investment, the result of both efficiency enhancement of the state sector and gradual inefficiency in the non-state's sector.

Accordingly, the ICOR improvement in the state sector is largely in line with this thesis's analysis of allocative efficiency improvements between 1998 and 2007, as SOE reform contributed considerably to the economy. The impact of a massive government-led investment plan in 2008, however, is reflected by the increase in ICOR for both state-owned and non-state-owned industrial sectors.

Figure 5.13 Industrial sector ICOR, classified by ownership structure, 2000–2010



Note: Author's calculations. China Industry Economy Statistical Yearbook (various issues); China Statistic Yearbook (2012).

In contrast to Zhang (2005), who documented a lower ICOR, or higher investment efficiency of non-state sector over the state sector between 1980 and 2000, this thesis found the reverse. One reason might be differences in data coverage. In this thesis's

estimation, the IVA for non-state sector is calculated from the gross IVA data in national income accounting minus SOEs. This means that both formal and informal non-state industrial sectors are covered in this sample, while in Zhang, only the formal sector was included.

5.4.2.3 Validity of ICOR as an efficiency indicator

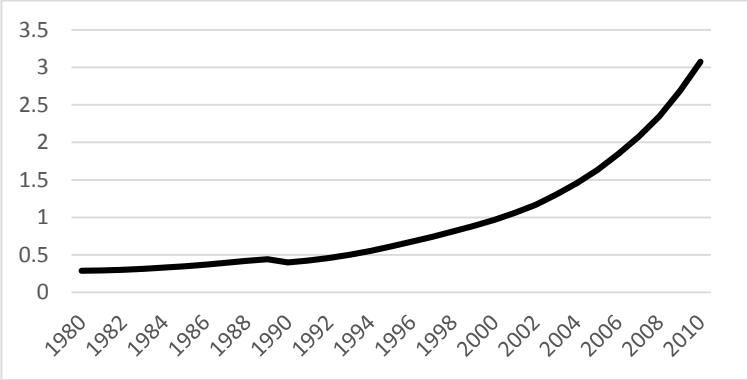
From the aspect of factor inputs in economic activities, an increasing or decreasing ICOR can be understood as a reflection of different developmental paths. The relative low ICOR from 1980 to1994, in comparison to 1995 to 2010, may suggest a higher share of labor input in economic development in the first half of the reforms (see Figure 5.14).

One assumption behind the effectiveness of ICOR as an efficiency indicator is a steady share of either labor input or capital input in economic activities over years, which has not held true in the case of China. In Figure 5.14, the share of capital in total input had substantial increased in the post-1994 period as compared to the entire reforming period. This suggests a rapid capital deepening process during the second half of the reform periods. If the change in relative share of capital and labor is not controlled, the use of ICOR as a proxy of investment efficiency may be biased. In Figure 5.14, the capital stock is estimated via the perpetual inventory method (PIM), Following Zhang (2008), the initial benchmark capital stock in 1978 was estimated as gross fixed capital formation divided by 10%, and the series of capital stock was deflated to real 1978 price.[20] The depreciation rate was is set at 4%, given that the official rate of 3.6% could

[20] The implicit deflator for capital in China is only available after 1991. To generate the deflator before 1991, this thesis uses the method in Zhang (2008). For any year, the

be biased due to expansionary capital booming during the reform period.

Figure 5.14 Capital-labor ratio of China, 1980–2010



Source: Author's calculation. China Statistic Yearbook (2012).

A more fundamental problem for using ICOR as an efficiency indictor is the existence of aggregate production function and the measurement of capital stock. The using of different production functions could largely change the result of ICOR. Furthermore, from the Keynesian tradition, there is no way to measure aggregate capital stock to meet theoretical satisfaction.

Analyzing the ICOR in China's economy, it is clear that the aggregated investment efficiency fluctuated frequently. Given that the change in ICOR was affected by many factors, such as structural changes in the economy, the division of labor and the naturals of different industries, it is hard to know whether or not the overall efficiency of aggregate investment improved throughout the reform periods. The same issue in a comparison between the state-sector and non-state sector.

implicit deflator for fixed capital formation (1978 = 1) is constructed by $\frac{Gross\ fixed\ capital\ formation\ at\ year\ t\ (current\ price)}{The\ index\ of\ fixed\ capital\ formation\ at\ year\ t\ (1978=1)}$ / $Gross\ fixed\ capital\ formation\ at\ year\ 1978\ (current\ price)$. The index of fixed capital formation was collected from National Bureau of Statistics (1997b).

Particular time periods that recorded an obvious decrease of ICOR, such as from 1980 to 1994 and from 1998 to 2007, but with an increase in the capital–labor ratio, would indicate significant improvement in allocative efficiency during that period. Clearly, SOE reforms made significant and positive contributions to this period of time.

5.5 Summary

When efficiency attributes are taken into consideration in China's financial development, the method to measure allocative efficiency is almost the same as the method to measure financial liberalization, which emphasizes a more efficient private, or non-state, sector in the economy. In this respect, under neoliberalism, financial development thus equals financial liberalization and improved allocative efficiency. In the Chinese context, it is thus vital to verify the assumption of more efficient non-SOEs and non-SOBs. If such assumptions are held, indicators such as the proportion of bank credit extended by SOBs and to SOEs in total banking lending would be proxies for allocative efficiency.

In this chapter the validity of the assumptions of inefficient SOEs and inefficient SOBs were examined. Based on industrial SOEs, it was found that the financial conditions of SOEs improved considerably. With increased market competition, the performances of SOEs are now at the same level as non-SOEs. Furthermore, as long-term-oriented institutions, an increased share of total IVAs of SOEs, as well as higher productivity, indicate that industrial SOEs make a direct contribution to the growth of the whole economy. In the discussion of SOBs and non-SOBs, it was also found that after shareholding reforms and public listing was completed, from the aspect of CAR, the NPL ratio and profitability of SOBs increased, allowing SOBs to outperform the JSCBs

or CCBs, which are two types of banks that are usually assumed to be more efficient than SOBs.

Linking these findings, it certainly suggests that using indicators with the assumption of a more efficient non-state sector to assess the allocative efficiency of the financial system in China is biased. Furthermore, despite the relative efficiency and profitability of SOEs and non-SOEs, if non-SOBs are more efficient in allocating resources than SOBs, a divergence in their lending behaviors would simply mean better financial positions for the non-SOBs. The improvement and then outperformance by the SOBs suggests that their lending to SOEs cannot simply be judged as an inefficient use of resource allocation, but is rather contains market-conforming attributes.

Finally, this chapter adopted two alternative methods to estimate changes in allocative efficiency in China from an aspect of financial development: through deviation from market-level credit provision, and by efficiency of investment. From these two measurements, evidence indicated an increased allocative efficiency process throughout all the reforming period.

As argued in Chapter 2, allocative efficiency is only part of the efficiency attributes a financial system embodies. Analyzing interactive transformations between savings and investment also offers some insights. In Chapter 6 and 7, Chinese financial development, from the nexus of savings–investment and deposits–loans are analyzed.

Table 5.11 CAR for individual banks, 2000–2011, %

Type	Bank Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
SOBs													
	BOC	8.31	8.3	8.15	7.69	10.04	10.42	13.59	13.34	13.43	11.14	12.58	12.97
	CCB		6.88	6.91	6.51	11.29	13.57	12.11	12.58	12.16	11.7	12.68	13.68
	ICBC	5.38	5.76	5.54	5.52		9.89	14.05	13.09	13.06	12.36	12.27	13.17
	ABC									9.41	10.07	11.59	11.94
JSCBs													
	BOCOM			8.83	7.41	9.72	11.2	10.83	14.44	13.47	12	12.36	12.44
	Industrial Bank	9.9	9.49	8.14	8.97	8.07	8.13	8.71	11.73	11.24	10.75	11.22	11.04
	Guangdong Development Bank								7.14	11.63	8.98	11.02	11.1
	Shanghai Pudong Development Bank	13.5	11.27	8.54	8.64	8.03	8.04	9.27	9.15	9.06	10.34	12.02	12.7
	Shenzhen Development Bank	17.56	10.57	9.49	6.96	2.3	3.7	3.71	5.77	8.58	8.88	10.19	11.51
	China Minsheng Bank	21.45	10.1	8.22	8.62	8.59	8.26	8.12	10.73	9.22	10.83	10.44	10.88
	China Merchants Bank	11.71	10.26	12.57	9.49	9.55	9.06	11.4	10.67	11.34	10.45	11.47	11.53
	CITIC Bank			5.85	8.9	6.05	8.11		15.27	14.32	10.14	11.31	12.27
	China Everbright Bank				4.65		-1.47	-0.39	7.19	9.1	10.39	11.02	10.57
	Huaxia Bank		7.63	8.5	10.32	8.61	8.23	8.28	8.27	11.4	10.2	10.58	11.68
CCBs													
	Shanghai Rural Commercial Bank						8.26	7.32	9.16	11.8	11.95	17.23	16.12
	Bank of Chongqing					4.29	9.71	12.07	10.65	10.77	13.75	12.41	11.96
	Yinzhou Bank						4.08	7.23	10.24	12.37	11.52	12.35	12.92
	Bank of Beijing				7.37	5.27	10.83		20.11	19.66	14.35	12.62	12.06
	Bank of Shanghai	12.26	13.27	10.59	10.79	10.89	11.11	11.62	11.27	11.27	10.29	10.7	11.75

Source: Author's calculation. GTA Data Online (2014). There is no official CAR for ICBC in 2004, so it is left blank.

Table 5.12 NPL ratio for individual banks, 2000-2011, %

Type	Bank Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
SOBs													
	BOC	27.2	27.51	23.37	16.28	5.13	4.62	4.04	3.12	2.65	1.52	1.1	1
	CCB	20.27	19.35	15.17	9.12	3.92	3.84	3.29	2.6	2.21	1.5	1.14	1.09
	ICBC	34.43	29.78	25.41	21.24	18.99	4.69	3.79	2.74	2.29	1.54	1.08	0.94
	ABC			30.07	30.66	26.73	26.17	23.43	23.5	4.32	2.91	2.03	1.55
JSCBs													
	BOCOM	35.15	23.58	19.65	13.31	2.91	2.37	2.01	2.06	1.92	1.36	1.12	0.86
	Industrial Bank	7.37	4.14	3.13	2.49	2.5	2.33	1.53	1.15	0.83	0.54	0.42	0.38
	Guangdong Development Bank							5.8	4	2.85	2.4	1.58	1.34
	Shanghai Pudong Development Bank	10.7	7.57	3.38	1.92	2.45	1.97	1.83	1.46	1.21	0.8	0.51	0.44
	Shenzhen Development Bank	21.76	14.84	10.29	8.49	11.41	9.33	7.98	5.62	0.68	0.68	0.58	0.53
	China Minsheng Bank	4.39	2.8	2.04	1.29	1.31	1.28	1.23	1.22	1.2	0.84	0.69	0.63
	China Merchants Bank	13.62	10.25	5.99	3.15	2.87	2.58	2.12	1.54	1.11	0.82	0.68	0.56
	CITIC Bank			10.35	8.12	5.96	4.11		1.48	1.36	0.95	0.67	0.6
	China Everbright Bank			13.13	9.34		9.57	7.58	4.49	2	1.25	0.75	0.64
	Huaxia Bank	7.18	7.05	5.97	4.23	3.96	3.04	2.73	2.25	1.82	1.5	1.18	0.92
CCBs													
	Shanghai Rural Commercial Bank						4.07	2.91	2.34	2.29	1.88	1.35	1.17
	Bank of Chongqing					20.03	4.93	81.06	1.06	0.77	0.47	0.36	0.35
	Yinzhou Bank						6.11	4.05	2.16	1.93	1.51	0.56	0.48
	Bank of Beijing				6.06	4.91	4.22		2.06	1.55	1.02	0.69	0.53
	Bank of Shanghai	8.27	6.77	8.75	5.97	4.99	3.92	3.48	2.41	2.23	1.59	1.12	0.98

Source: Author's calculation. GTA Data Online (2014).

Table 5.13 ROA for individual banks, %

c	Bank Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
SOBs													
	BOC	0.14	0.24	0.26	0.12	0.49	0.58	0.79	0.94	0.91	0.92	1.00	1.05
	CCB	0.30	0.19	0.14	0.63	1.24	1.03	0.85	1.05	1.23	1.11	1.25	1.38
	ICBC	0.13	0.14	0.14	0.05	0.04	0.52	0.65	0.94	1.14	1.09	1.23	1.35
	ABC	0.01	0.05	0.10	0.06	0.05	0.02	0.11	0.20	0.73	0.73	0.92	1.04
JSCBs													
	BOCOM	0.32	0.29	0.16	0.01	0.08	0.65	0.71	0.98	1.06	0.91	0.99	1.10
	Industrial Bank	0.09	0.39	0.27	0.38	0.32	0.52	0.61	1.01	1.12	1.00	1.00	1.06
	Guangdong Development Bank	0.16	0.14	0.14	0.13	0.04	-0.20	-0.17	0.61	0.51	0.51	0.76	1.04
	Shanghai Pudong Development Bank	0.32	0.29	0.16	0.01	0.08	0.65	0.71	0.98	1.06	0.91	0.99	1.10
	Shenzhen Development Bank	0.73	0.61	0.46	0.42	0.42	0.43	0.49	0.60	0.96	0.81	0.88	1.02
	China Minsheng Bank	0.75	0.33	0.26	0.16	0.14	0.15	0.50	0.75	0.13	0.86	0.86	0.82
	China Merchants Bank	0.63	0.47	0.36	0.39	0.46	0.49	0.55	0.69	0.75	0.85	0.96	1.25
	CITIC Bank	0.32	0.52	0.47	0.44	0.52	0.54	0.76	1.16	1.34	0.88	1.07	1.29
	China Everbright Bank	0.39	0.31	0.42	0.37	0.06	0.49	0.53	0.82	1.12	0.81	1.03	1.11
	Huaxia Bank	0.13	0.07	0.08	0.11	0.31	0.51	0.46	0.68	0.86	0.64	0.86	1.04
CCBs													
	Shanghai Rural Commercial Bank						0.26	0.29	0.24	0.43	0.93	0.88	1.03
	Bank of Chongqing					0.33	0.33	0.39	1.25	1.16	1.08	1.00	1.15
	Yinzhou Bank						0.13	0.35	1.05	1.42	1.17	1.55	1.72
	Bank of Beijing				0.42	0.16	0.24	0.78	0.95	1.30	1.06	0.93	0.94
	Bank of Shanghai	0.88	0.70	0.46	0.59	0.67	0.53	0.62	0.95	0.84	0.78	0.89	0.89

Source: Author's calculation. GTA Data Online (2014).

Table 5.14, ROE for individual banks, %

Type	Bank Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
SOBs													
	BOC	2.80	3.58	3.99	2.18	8.99	10.47	10.03	12.36	12.86	14.82	15.44	16.43
	CCB	6.57	4.30	4.01	12.02	24.85	16.37	14.03	16.35	19.80	19.10	19.24	20.73
	ICBC	2.77	3.17	3.59	1.43	1.38	13.09	10.33	14.93	18.24	18.94	20.10	21.74
	ABC	0.22	0.87	2.13	1.39	2.57	1.31	6.91	13.40	17.72	18.95	17.50	18.76
JSCBs													
	BOCOM	6.59	5.89	3.77	0.20	1.74	11.12	13.56	15.93	19.52	18.29	17.46	18.60
	Industrial Bank	2.16	8.21	7.51	14.07	10.52	20.26	23.45	22.07	23.22	22.29	20.13	21.97
	Guangdong Development Bank	5.14	5.21	5.42	6.80	-0.37	-19.47	-4.89	17.30	14.20	15.26	14.43	18.19
	Shanghai Pudong Development Bank	12.87	15.03	16.15	13.04	14.15	16.01	13.57	19.43	30.01	19.41	15.56	18.25
	Shenzhen Development Bank	10.69	11.09	11.47	7.98	6.19	6.97	20.12	20.37	3.74	24.58	18.75	13.64
	China Minsheng Bank	7.16	11.91	14.85	14.42	15.79	17.48	19.85	12.62	14.42	13.62	16.70	20.82
	China Merchants Bank	20.11	28.00	10.82	12.21	15.06	15.93	12.88	22.42	26.42	19.65	19.23	21.90
	CITIC Bank	10.79	9.94	15.17	9.17	1.62	13.97	11.71	9.85	13.97	13.38	17.27	17.24
	China Everbright Bank	2.16	1.40	2.12	3.25	-23.45	-86.38	3.75	20.41	22.02	15.88	15.70	18.79
	Huaxia Bank	26.35	30.55	19.59	9.29	10.58	12.33	12.51	16.09	11.20	12.44	16.87	14.43
CCBs													
	Shanghai Rural Commercial Bank						5.32	6.14	4.31	6.36	15.08	9.56	12.71
	Bank of Chongqing					4.38	5.27	5.37	21.17	19.90	21.70	21.70	22.91
	Yinzhou Bank						3.13	8.74	23.10	24.62	19.45	24.31	23.54
	Bank of Beijing				11.99	4.71	6.22	21.75	12.56	16.02	14.99	15.98	17.74
	Bank of Shanghai	15.08	11.79	9.44	13.28	20.05	13.04	13.34	19.88	16.33	16.84	17.05	16.46

Source: Author's calculation. GTA Data Online (2014).

Chapter 6

Financing investment in China

6.1 Introduction

The allocative efficiency view of finance mainly focuses on how well a financial system overcomes market frictions to achieve an efficient use of financial resources. The objective in the mainstream finance–growth theory is only the financial system itself, and it is assumed its only role is financial intermediation. Under this view, the interaction between a financial system and the real sector is largely neglected, and particularly important features of the financial system and banking system are not considered: money, credit, or financial resources creation.

The credit creation view of financial development can be traced to Schumpeter (1934), who first highlighted that only banks have the function of creating money (see Chapter 2). This view of financial resources creation, also known as the Keynesian–Schumpeterian theory of endogenous finance, is mainly held by post-Keynesian economists. According to the endogenous finance theory, the development of finance is defined by the ability to provide increased financial resources to facilitate real sector investment and, hence, achieve development. By channeling financial resources into the real sector, the efficiency gains in the endogenous finance process can be understood as productive efficiency.

Theoretically, the major differences between the allocative efficiency view of finance

and productive efficiency view of finance is the starting point of the business cycle. From the allocative efficiency view, the quantity of available investment funds is predetermined by savings; and savings are assumed to correlate only with the propensity to save, which is exogenously determined. The quantity of loanable funds is treated as a given number, so possible increases in total savings—the result of economic successes from previous investment—are not even considered. In contrast, from the aspect of productive efficiency, the starting point is the willingness of investment by entrepreneurs. Given the willing to investment, the financial system creates credit "out of nothing" (Herr, 2010) to fulfill demands, and the outcome of investment—economic development—generates additional savings that become available financial resources for future investment projects. The difference in views of whether it is savings that cause investment or investment that cause savings is the difference between the allocative efficiency and productive efficiency views of finance.

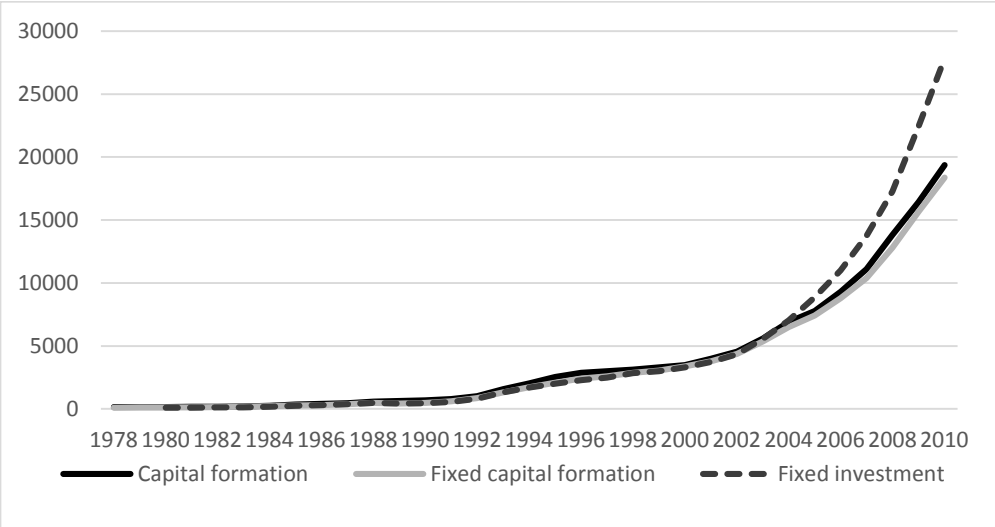
Before analyzing the causal direction between investment and savings, a comprehensive understanding of their features is vital. Accordingly, in this chapter concentration is given to the changes in aggregate savings and investment in China from a macro view, and to deposits and loans from a meso-level view. By assessing the features of savings and investment, and deposits and loans in China, this chapter provides a solid background for the analysis in Chapter 7, in which both productive and allocative views of financial development in China, from the angle of efficiency attributes, is discussed. The interactions between savings and investment, and deposits and loans, as well as their causal relationships, will also be assessed in this chapter.

6.2 Investment

6.2.1 General investment in China

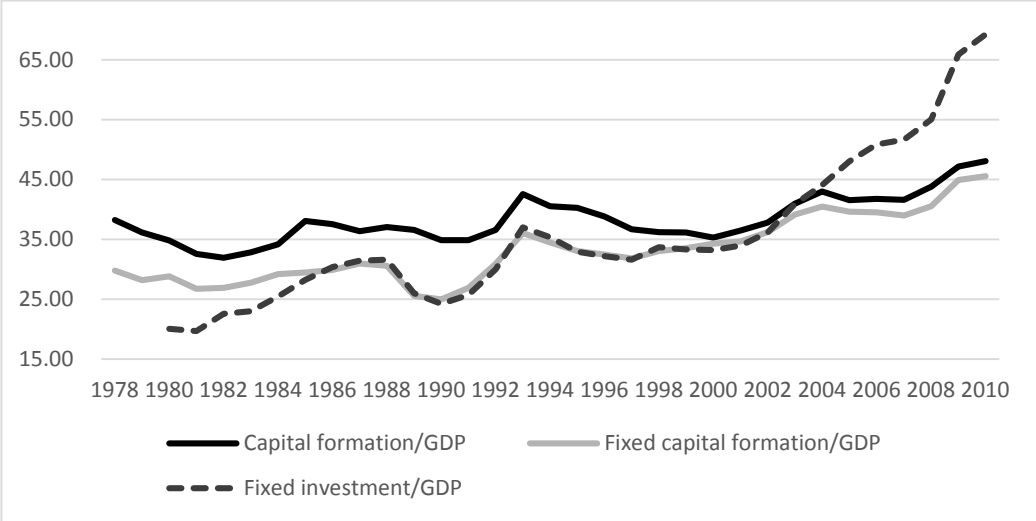
There are two methods to estimate gross investment in an economy, according to different statistical methods. The first way to measure investment is to use capital formation data, which includes both gross fixed capital formation and change in inventory stocks, to account for national income through an expenditure approach. The second method adopts the data from total investment in fixed assets in the entire economy. A general overview of investment in China from both methods is displayed in both level terms (see Figure 6.1) and in terms of GDP (see Figure 6.2).

Figure 6.1 Gross investment in China, 1978–2010, billion CNY



Source: China Statistic Yearbook (2012).

Figure 6.2. Investment to GDP ratio in China, 1978–2010, %



Source: China Statistic Yearbook (2012).

As can be seen from Figure 6.1, throughout all reform periods, whether in absolute or relative terms, there is an upward arch for both gross investment and the ratio of investment to GDP. In 1980, the nominal volume of total capital formation and fixed capital formation were 160 billion CNY and 132 billion CNY, respectively. In 2010, they were 19,360 and 18,361 billion CNY, which is an increase of more than 100 times. The investment to GDP ratio shows the same tendency in that the rate of gross capital formation and fixed capital formation over GDP rose nearly 14%, from 34.8% to 48.3%, and nearly 17%, from 28.8% to 45.7% (see Figure 6.2). The changes in the fixed assets investment show an even sharper increase, where during the same period, fixed investment to GDP ratio tripled, from 20% in 1980 to more than 65% in 2010. Even when the change in price and inflation have been controlled, real fixed investment in absolute terms increased more than 50 times.[21]

What is worth noticing here is that, among gross capital formation, the fixed capital contributed the majority and changes in inventories gradually diminished throughout all

[21] Author's calculation by adjusting official nominal data to 1980 constant price.

reform periods, which can be observed by the convergence of gross capital and fixed capital formation in GDP terms. Although diminishing inventories are usually interpreted as a reflection of enhanced efficiency in business cycles, according to Riedel et al. (2007), the high stock of inventories accumulated before 2000 is attributable to social security reasons; that is, to maintain employment in insolvent state-owned enterprises (SOEs). When the government finally allowed SOEs to reduce the number of employee in 1998 so as to achieve better financial performance, there was stiff competition from private firms; inventories declined as more financial resources were allocated to fixed investment (Lardy, 2005, p.12).

Table 6.1 Investment world comparison, 1978–2010, % of GDP

Country	Gross capital formation			Gross fixed capital formation		
	1978-1990	1991-2000	2001-2010	1978-1990	1991-2000	2001-2010
China	36.18	38.95	42.59	28.93	33.61	40.32
Brazil	21.24	18.58	17.72	21.24	17.86	17.12
Russia	31.98	24.30	21.58	30.23	19.62	19.64
India	22.05	23.85	32.63	20.22	23.04	29.25
South Africa	23.33	16.47	18.63	23.21	15.90	18.05
Korea	31.59	34.69	29.39	30.76	34.90	28.86
Japan	30.06	28.07	22.22	29.62	27.93	22.27
United States	19.92	18.50	18.08	19.41	17.99	18.02
Germany	22.72	22.30	18.18	22.22	22.00	18.06
Low income	16.52	18.01	21.43	16.04	17.44	20.94
Middle income	26.96	27.41	29.08	23.98	24.90	27.13
High income	22.90	21.37	20.13	22.35	20.90	19.89

Source: World Bank (2013).

From the perspective of an international comparison, Table 6.1 shows that the investment rate in China remained high. Among the BRICS emerging economies, only China and India have recorded growing investment rates over the last 30 years. When classified by national income level, the share of investment in GDP for low-income economies grew faster than for middle-income economies, and high-income economies

recorded a negative trend. However, comparing investment rates of economies at different stages of development can lead to biased results. According to Ma and Yi (2010), similar to China and India, East Asian economies also experienced rapid and sustained growth in investment rates during their “catch-up” phases. For example, over the course of 20 years, starting in the mid-1950s, the investment rate for Japan increased by more than 10%, from nearly 25% to more than 35%. Korea also reported more than 10% growth in investment rates from 1970 to the mid-1990s.

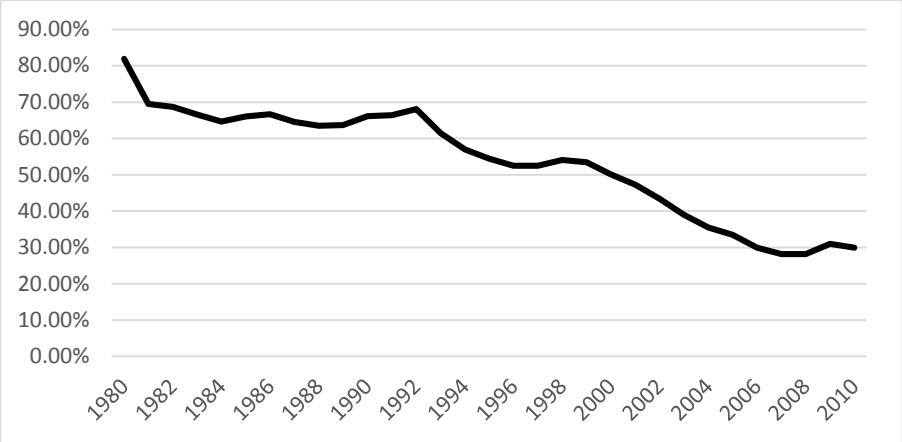
6.2.2 Investment by ownership structure

Due to unavailable data and changes in statistical standards, discussed earlier in this thesis, the only consistent data throughout all the reform periods is the fixed investment data of the SOEs. In Figure 6.3, it can be seen that fixed asset investment contributed by the state sector declined sharply, from over 80% in 1980 to nearly 30% in 2010. One possible explanation for the declining shares of investment by SOEs is the decreased number of SOEs, starting in the late 1990s. According to Knight and Ding (2012, p. 157), the total number of SOEs was halved, from nearly 238,000 in 1998 to 112,000 in 2007.

Given the improvement in financial performances, and that shares in total industrial value–added (IVA) of SOEs was maintained (see Chapter 5), the declining share in investment of SOEs implies an increase in overall investment efficiency of SOEs. This is reflected in this thesis’s analysis based on the incremental capital-output ratio (ICOR; see Chapter 5). However, Riedel et al. (2007, p. 40) point out that if investment per capita is used, the picture is different. SOEs’ share in total fixed investment remained at about 30% by the end of 2010; their share in total employment, however, was only

around 8.53% between 2006 and 2010. It is not fair to conclude from this data that SOEs had invested too heavily. Today's large SOEs are mainly in resource industries, which are capital-intensive industries. Therefore, the higher per capita investment by SOEs could simply reflect the nature of these industries.

Figure 6.3 Share of total fixed investment by state sector, 1980–2010, %



Source: China Statistic Yearbook (2012); National Bureau of Statistics of China (2013)

6.2.3 Investment by source of funds

Table 6.2 shows the gross domestic investment in fixed assets from 1981 to 2010 by different sources of funds. According to the official definition (China Statistic Yearbook, 2012), self-raising funds in fixed investment refer mainly to retained earnings, while the "Others" category consists mostly of funds raised by issuing bonds and stocks. Funds raised through internal finance and equity finance are considered direct finance; it is clear that internal finance is the main method China's firms use to raise investment funds.

Table 6.2 Investment by source of funds, 1981–2010, %

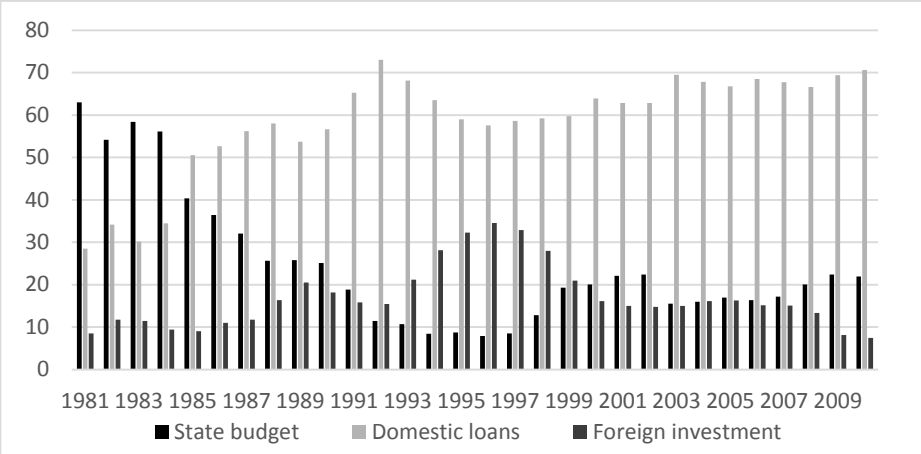
Year	State budget	Domestic loans	Foreign investment	Self-raising funds and Others	# of self-raising funds	# of Others
1981	28.07	12.69	3.79	55.45	---	---
1982	22.70	14.31	4.92	58.07	---	---
1983	23.75	12.27	4.66	59.32	---	---
1984	22.97	14.10	3.86	59.07	---	---
1985	16.03	20.07	3.60	60.30	---	---
1986	14.60	21.10	4.40	59.90	---	---
1987	13.10	23.00	4.80	59.11	---	---
1988	9.28	21.01	5.92	63.79	---	---
1989	8.30	17.30	6.60	67.80	53.41	14.39
1990	8.70	19.60	6.30	65.40	51.57	13.83
1991	6.80	23.50	5.70	64.00	51.46	12.54
1992	4.30	27.40	5.80	62.50	49.81	12.69
1993	3.70	23.50	7.30	65.50	47.57	17.93
1994	2.97	22.42	9.92	64.68	44.88	19.80
1995	3.03	20.46	11.19	65.33	51.88	13.45
1996	2.68	19.58	11.76	65.98	47.74	18.24
1997	2.76	18.93	10.63	67.68	49.71	17.97
1998	4.17	19.30	9.11	67.42	48.81	18.61
1999	6.22	19.24	6.74	67.79	49.20	18.59
2000	6.37	20.32	5.12	68.19	49.28	18.91
2001	6.70	19.06	4.56	69.68	52.39	17.29
2002	7.02	19.67	4.63	68.69	50.65	18.04
2003	4.59	20.55	4.43	70.43	53.65	16.78
2004	4.37	18.49	4.41	72.74	55.35	17.39
2005	4.39	17.25	4.21	74.15	58.26	15.89
2006	3.93	16.47	3.64	75.96	59.75	16.21
2007	3.88	15.28	3.40	77.43	60.59	16.84
2008	4.35	14.46	2.90	78.29	64.79	13.50
2009	5.07	15.71	1.85	77.38	61.35	16.03
2010	4.72	15.20	1.60	78.48	63.38	15.10

Source: China Statistic Yearbook (2012); National Bureau of Statistics of China (2013).

Along with the funds raised internally, for external finance (which include direct government capital transfers from the state budget, loans extended from the banking system, and foreign funds), it is clear that bank financing has dominated the entire financial sector (see Figure 6.4**)**. The share of state budget in all sources of investment funds dropped from 28% in 1981 to no more than 5% in 2010. There has been a similar occurrence in all methods of external finance. Foreign investment shows an upward curve in the first half of the sample years, but there is a downward curve starting in

1996, which shows the highest share at a rate of 12% of all investment sources. By the end of 2010, foreign funds contributed only 1.6% to total fixed investment.

Figure 6.4 Composition of external finance, 1981–2010, %



Source: China Statistic Yearbook (2012); National Bureau of Statistics of China (2013).

To explain the relatively high share of "self-raising funds" and "others" among all sources of funds in investment financing, Riedel et al. (2007, p. 43), argued that these two categories also include funds raised by informal financial markets. Therefore, despite both direct and indirect financing, the high share of self-raising funds and others in all source of investment may reflect the emergence of informal finance. Allen Qian, and Qian (2005, 2008) found that informal finance positively promoted economic development in China through easing financial constraints, especially for non-SOEs. However, according to a firm-level study by Ayyagari, Demirgüç-Kunt, and Maksimovic (2010), although most of the firms in their data sample relied on informal financing rather than formal bank financing, it was the formal financing that promoted higher firm-level growth. One possible reason for this conflicting evidence is the high cost involved with informal finance: loans extended by informal financial markets are associated with higher interest rates. In some extreme cases, that rate could be more

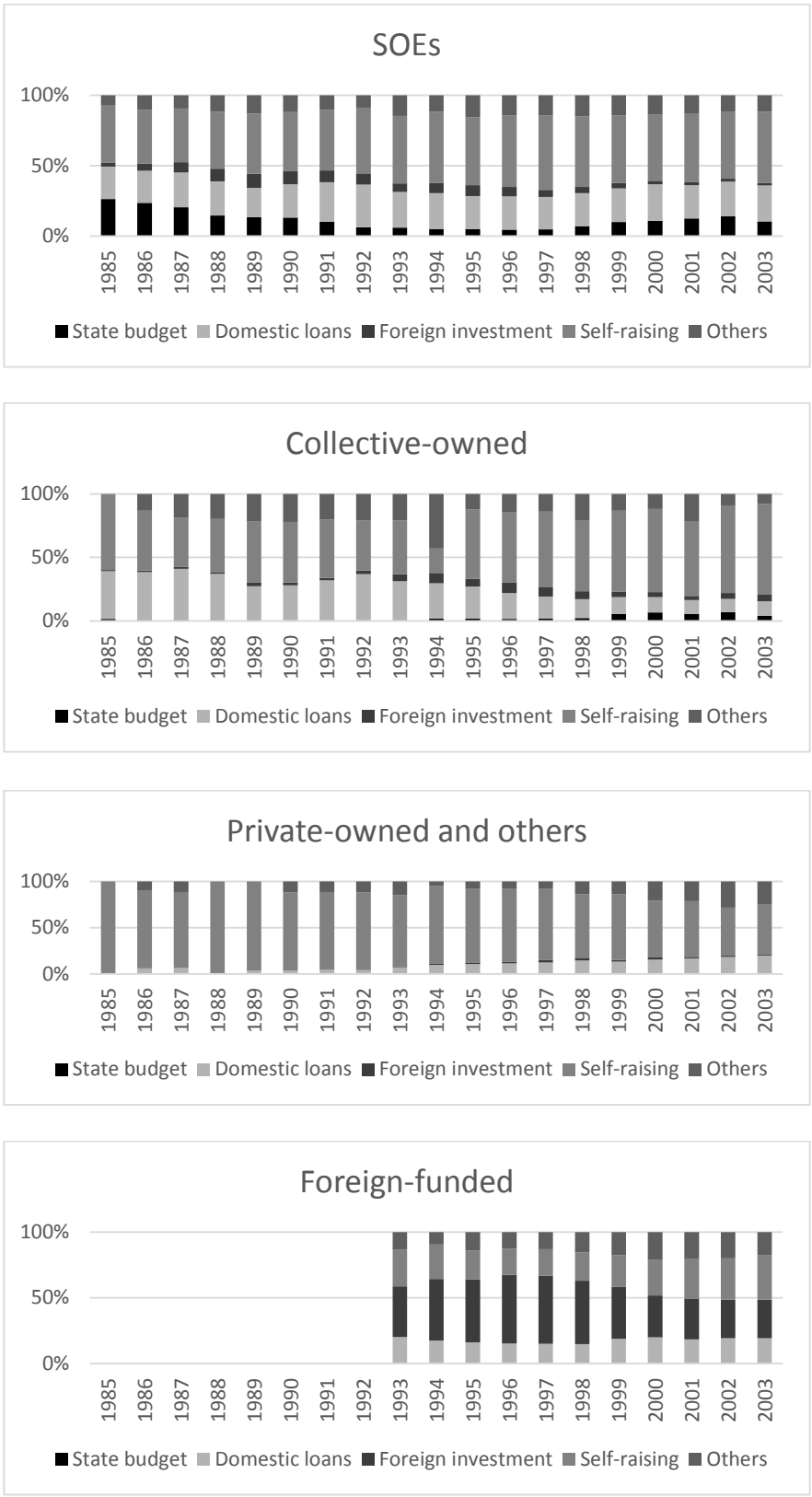
than 10 times the official lending rate.

These explanations for the high ratio of “self-raised and others” in all investment funds highlight the importance of financial development in China. However, it is not necessary to assume that a more competitive, market-based financial system can reduce the share of self-raised funds in all total investment. As Knight and Ding (2010) found, risk aversion by borrowers and limited information on borrowers can also result in a high share of self-raised funds in investment. In a representative case by Mayer (1988), *retained earnings* financed 70% of corporate investment in the United Kingdom between 1970 and 1985, yet the UK’s *financial sector* was labeled as more efficient.

6.2.4 Investment by sources of funding and ownership structure

Detailed official data of investment (see Table 6.5 and Table 6.6 at end of this chapter) in fixed assets by both ownership and source of funding is only available between 1985 and 2003, but by analyzing the evolution of the composition of gross investment — for example, the changing position of the state and non-state sectors, and the changing role of internal and external financing in total fixed investment over years — it is possible to examine the earlier interpretations.

Figure 6.5 Investment financing by ownership, 1985–2003, %



Source: Author's calculation. China Statistic Yearbook (various issues). Data of foreign-funded enterprises is only available starting in 1993. Before 1993, the private-owned and others category only included individually owned enterprises. After 1993, this category also included firms with joint ownership, shareholding enterprises, and other firms.

In comparing entities with different ownership, Figure 6.5, surprisingly shows that self-raising funds were the largest source of investment funds for SOEs, contributing on average nearly half of total fixed investment every year between 1985 and 2003. The share of bank loans remained stable over this period, for a weight of 20% to 30%. The declining share of state budget is quite significant, from more than 20% in 1985 to 10% at 2003, with its lowest share being 4.6% in 1996.

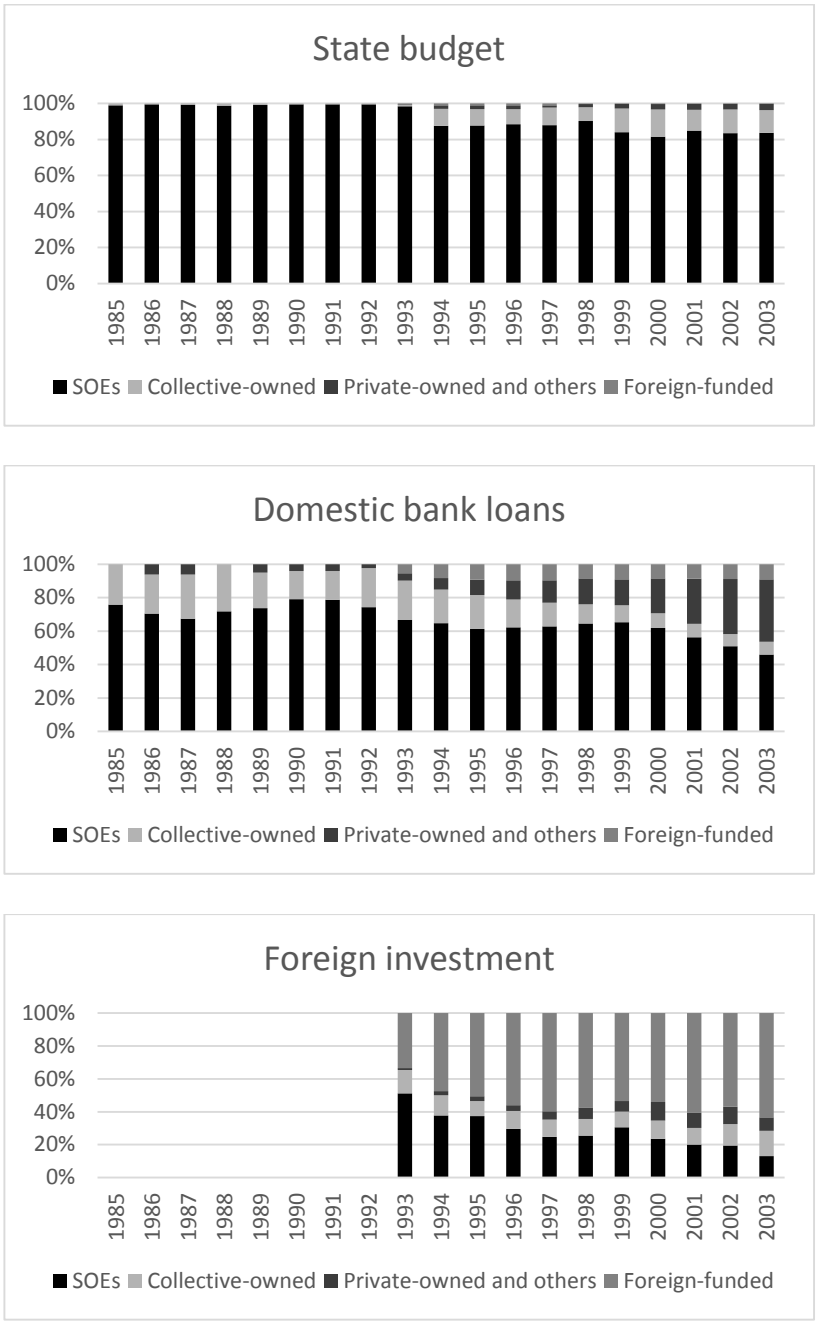
For private-owned and other firms, the situation was largely different before 1992. Self-raising funds were the only type available for privately owned enterprises looking to create investment plans. Starting in 1993, there was an increase in both bank credit and funds raised from "others," which mainly refers to issuing bonds and stocks, and an informal or even underground financial market. By the end of 2003, more than 40% of all investment funds were raised by bank credit (20%) and "other" funds (20%). Interestingly, along with decreased capital transfers from the state, foreign investment also rarely flowed to private-owned firms, especially when compared to SOEs and collective-owned enterprises.

Collective-owned enterprises recorded a drop in shares of formal bank lending in all investment funds over the period being analyzed. Meanwhile, approximately 18% to 20% of investment of foreign-funded enterprises were supported by domestic banks.

When a comparison of different sources of funds (see Figure 6.6) is linked to the comparison of different ownerships, a comprehensive picture is formed. First, the majority of state capital was channeled to the SOEs, and since 1994, a small proportion, between 10% and 15%, has been given to collective-owned enterprises. Second, looking

at the distribution of bank credits, fewer loans in fixed investment have been extended to SOEs, especially after 1992; and that share dropped from nearly 80% in 1990 to 46% by the end of 2003. This decrease fits with this thesis's analysis for the share of SOEs in total bank lending (Figure 4.8).

Figure 6.6 Investment financing classified by source of funds, 1985–2003, %



Source: Author's calculation. China Statistic Yearbook (various issues). The data for foreign-funded enterprises is only available after 1993. Before 1993, the private-owned and others category included only individually owned enterprises. After 1993, it also included firms with joint ownership, shareholding enterprises, and other firms.

Third, a growing proportion of bank credit was granted to private-owned and foreign-funded firms, which is the converse for SOEs and collective-owned enterprises. By 2003, loans extended to both private-owned and foreign firms exceeded loans to SOEs. Although the data for 2004 is not available, a continuing tendency can be expected, in reference to both decreasing shares of state-owned commercial banks (SOBs) in total bank lending and SOEs in total loans granted (see Figure 4.7 and Figure 4.8). Fourth, SOEs were becoming less favored by foreign funders, who were channeling increasing shares to foreign-owned firms. An increasing stake of foreign funds flowed to private-owned enterprises, though small, occurred as well.

These findings of investment by ownership and source of funds lead to several points. The first is that the state sector decreased its financing investment, as seen by the declining shares of SOEs and lowered state budget in gross fixed investment and sources of investment funds. There was also a drop in the flow of the share of funds from formal bank lending and foreign sources to SOEs. However, the majority of state budget financing kept transferring to SOEs.

The second point that can be drawn is that bank loans contributed 15% to 20%, on average, to fixed assets investment, and dominated external financing of Chinese firms. This increase was particularly strong in the non-state sector, that is, to private-owned and foreign-owned firms. However, the increase of “other funds” in the investment of private-owned firms, starting in 1994, suggests frequent use of informal financing to raise funds. Generally, firms usually use formal bank financing because interest rates from informal financial markets are generally higher than the price of credit from banks. More bank loans have been granted to the private sector while non-SOEs still face

difficulties in accessing formal bank financing.

The third and final point, from the aspect of sources of funding is that self-raising funds have remained the largest source of fixed investment funds for both state and non-state sectors (though not for foreign-funded firms). There are two possibilities.. The first possibility is the existence of financial constraints for both state and non-state sectors, such as credit rationing in banking practices, if it is assumed that firms prefer bank financing to internal financing. The second possibility is that the dominance of self-raising funds in fixed investment simply reflects the preference for internal finance; or it may suggest the relative inefficiency of the financial sector as a whole, which stresses the importance of continued financial reforms.

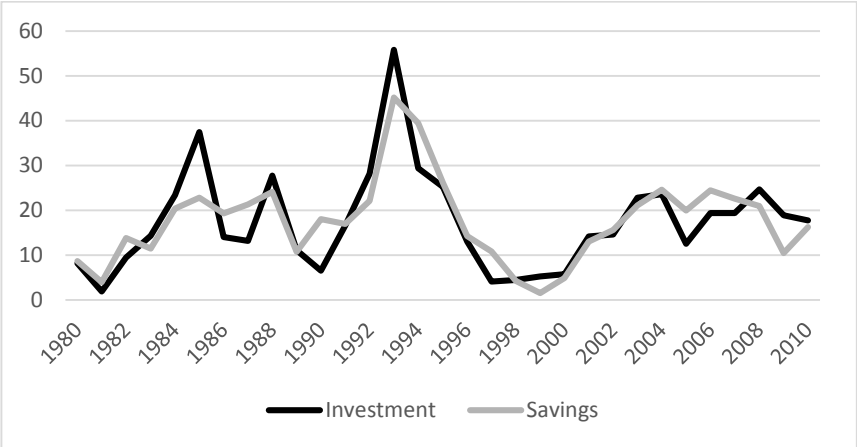
6.3 Savings

6.3.1. Savings from expenditure-based GDP and world comparison

Unlike the account held by Feldstein and Horioka (1980) that the linkage between domestic savings and investment could be weak in a highly integrated capital market, for economies with strict restrictions on cross-border capital movement, such as China's,[22] high investment rates may be associated with high savings rates. This can be observed by the analogous annual growth rate of gross investment and savings (see Figure 6.7). Derived from a definition of national account, $S = I + CA$, where gross savings are equal to the sum of gross investment and the balance of current account, China's gross national savings can be estimated by totaling the data of gross capital formation and net exports of goods and services from expenditure-based GDP.

[22] As of June 2013, China's capital account was still not fully open and convertible.

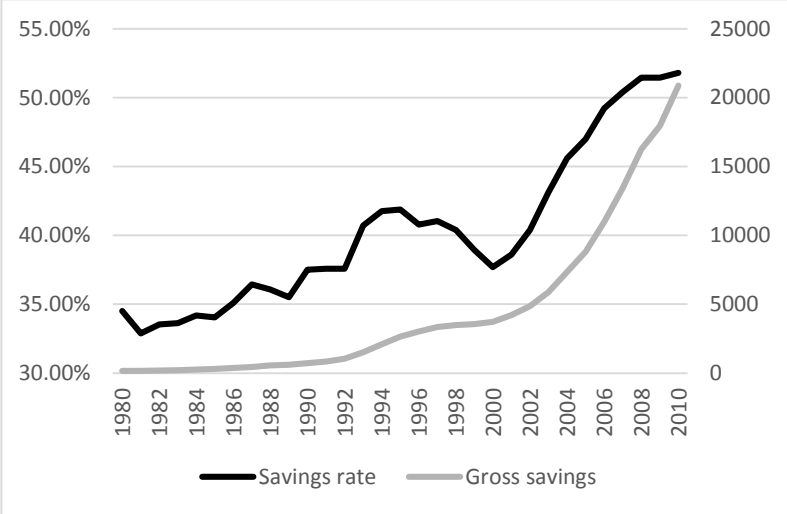
Figure 6.7 Annual growth rate, gross investment and savings, 1980–2010, %



Source: Author's calculation. China Statistic Yearbook (2012). Investment is measured by gross capital formation data from expenditure-based GDP.

As seen in Figure 6.8, there was a substantial expansion of gross national savings over the entire reform period, which is reflected in the increased share of gross savings in GDP, from less than 35% in 1980 to 52% by the end of 2010. What is worth noting, however, is that the savings rate did not increase continuously. There was an unusual drop in the savings rate, from 42% in 1995 to 38% in 2000, when saving rate began to rise again.

Figure 6.8 Gross national savings and the saving rate (from expenditure-based GDP), 1980–2010, billion CNY and %



Source: Author's calculations. China Statistic Yearbook (2012).

Table 6.3 Savings rate, world comparison, 1980-2010, %

Country/Country-Type	1980-1990	1991-2000	2001-2010
China	36.44	40.42	47.89
Brazil	19.78	16.25	16.78
Russia	N/A	26.80	29.49
India	21.12	24.18	32.21
South Africa	23.88	16.28	15.35
Korea	30.69	35.75	31.39
Japan	31.79	30.59	25.60
United States	17.05	16.64	13.88
Germany	19.81	20.75	22.67
Low income	13.41	16.76	20.76
Middle income	25.79	26.67	30.55
High income	21.24	20.80	19.79

Source: World Bank (2013).

In a comparison of world savings rates (see Table 6.3), there is a similarity in the comparison of investment rates between China and other countries. First, among BRICS countries, only China and India have recorded a rising savings rate, with an increase of more than 10% over the 30-year period. The selected developed economies, except for Germany, reported a decreased or wavering savings rate over the sample period. A faster growing savings rate has been captured in low-income economies, when

compared with middle-income economies, and high-income economies have shown, on average, a negative tendency.

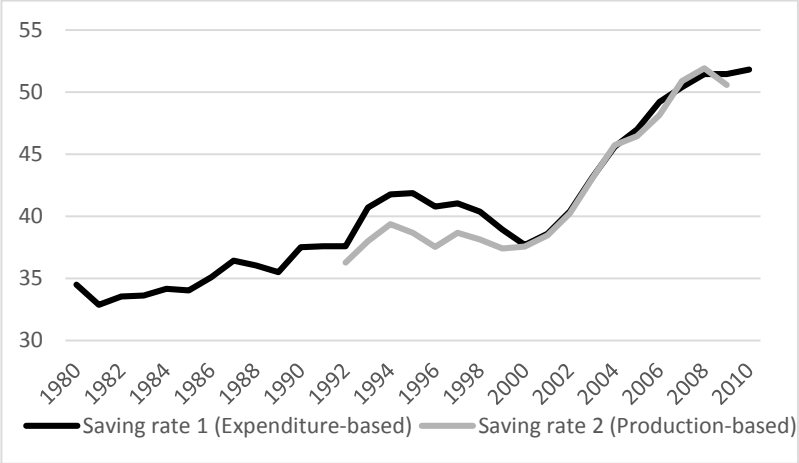
6.3.2 Composition of savings from production-based GDP

Gross national savings can be estimated not only from expenditure-based national accounting, but also from production-based national income. According to the structure of Flow of funds statistics, gross savings can be broken down into sectors, such as household, corporate, and government, which can provide in-depth details on the gross savings in China. However, as the official Flow of funds data in China only became available starting in 1992, there is only partial insight into the composition of savings, as the features of savings in the early stages of reform are unknown.

The annual savings rate by sector, generated from Flow of funds statistics, is found in Table 6.4. It should be noted that in both 2008 and 2012, the National Bureau of Statistics updated the Flow of funds statistics for previous years. This means there are three versions of Flow of funds statistics (National Bureau of Statistics of China, 2008; China Statistic Yearbook, various issues). In order to keep consistency in the data series in Table 6.4, all three versions were consulted.

The saving rate series based on expenditure GDP and the production-based saving rates each had an upward direction, and these two curves became nearly identical, especially starting in 2000 (Figure 6.9).

Figure 6.9 Savings rates according to different methods, 1980-2010, %



Note: Author's calculations. China Statistic Yearbook (2012); National Bureau of Statistics of China (2008).

Table 6.4 Saving rate (from production-based GDP) and composition of savings by sector, 1992–2008, %

	% of gross national disposable income				% of total savings		
Year	Total savings	Household	Government	Corporate	Household	Government	Corporate
1992	36.29	20.19	4.39	11.70	55.65	12.10	32.25
1993	38.01	18.16	4.12	15.73	47.77	10.84	41.39
1994	39.36	21.67	3.17	14.53	55.04	8.05	36.90
1995	38.68	19.89	2.57	16.22	51.43	6.63	41.94
1996	37.54	20.15	3.71	13.69	53.67	9.87	36.46
1997	38.66	21.56	4.01	13.10	55.76	10.36	33.88
1998	38.13	21.37	3.31	13.45	56.04	8.68	35.28
1999	37.41	20.04	2.67	14.70	53.57	7.13	39.30
2000	37.56	20.99	-1.37	17.94	55.89	-3.64	47.75
2001	38.46	20.62	-1.08	18.92	53.61	-2.81	49.19
2002	40.24	20.28	0.62	19.34	50.39	1.54	48.06
2003	43.05	21.71	1.40	19.94	50.43	3.25	46.32
2004	45.74	20.63	2.59	22.51	45.11	5.67	49.22
2005	46.46	21.53	3.33	21.60	46.34	7.16	46.50
2006	48.15	22.39	4.22	21.54	46.51	8.76	44.74
2007	50.89	23.11	5.68	22.10	45.42	11.16	43.42
2008	51.91	23.28	5.89	22.74	44.84	11.35	43.81
2009	50.57	24.44	4.94	21.19	48.33	9.76	41.90

Source: Author's calculation. National Bureau of Statistics of China (2008); China Statistic Yearbook (2012). Savings from the corporate sector is calculated by the sum of savings from non-financial corporations and financial institutions. China's Flow of funds statistics became available starting in 1992. For 1992 to 1999, Flow of funds data was adopted from National Bureau of Statistics of China (2008); for 2000 onward, data adopted from China Statistic Yearbook (2012).

The corporate sector recorded the fastest growth in savings, over household and government sectors. What is worth noting is that only since 1998 has continuous and steady savings expansion occurred in the corporate sector, as seen in the increasing share of corporate sector savings in both total savings and GDP. Given the SOE reforms at that time, the growth in corporate savings may, to a certain extent, be explained by the enhanced efficiency and financial performances of the SOEs. Whatever the reasons, the savings rate of the corporate sector over GDP nearly doubled between 1992 and 2009, from 11.7% to 21.2%, and more than 8% was achieved after 1998.

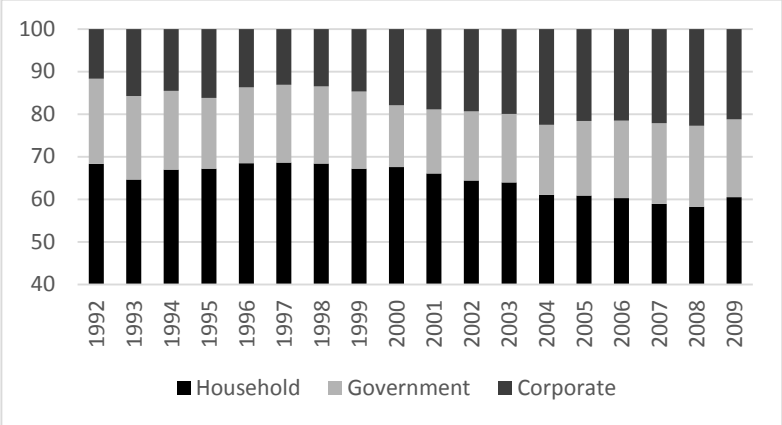
Savings from the government sector, however, experienced a *U*-shaped pattern that touched bottom in 2000 and 2001, when negative numbers were reported. Although government savings were nearly restored in 2007 and 2008 to its initial 1992 level, its importance and contribution to total savings remains minor.

Although the savings rate of household sector to GDP slightly increased from 20.2% to 24.4% during the sample period, its share in total savings recorded a falling trend. Though the household sector continues to save the most, since the late 1990s, the driving force behind China's substantial accumulation in savings has been the corporate sector.

6.3.3 Savings from the Flow of funds statistics

The Flow of funds statistics provided both disposable income and savings by sectors, making it possible to study the evolution of gross savings and the savings rates in different sectors. Figure 6.10 shows the total share of disposal income by household, government, and corporate sectors.

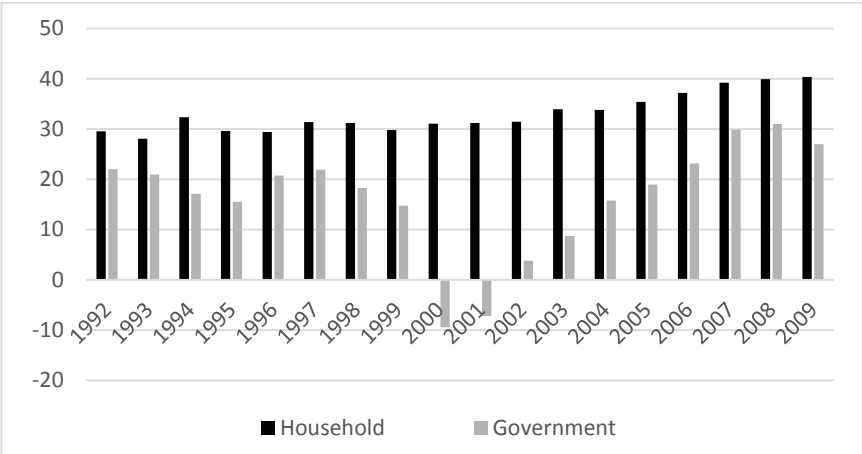
Figure 6.10 Share of total disposable income by sector, 1992–2009, %



Source: Author's calculation. National Bureau of Statistics of China (2008); China Statistic Yearbook (2012).

The gross savings rate is equal to gross savings over gross national income, which is a reflection of the overall propensity to save. The change in savings rates of each sector can thus be interpreted by two factors: the sector's share in total disposable income (Figure 6.10) and the propensity to save (see Figure 6.11).

Figure 6.11 Propensity to save by sector, 1992–2009, %



Source: Author's calculation. National Bureau of Statistics of China (2008); China Statistic Yearbook (2012).

Given that in the corporate sector there is no concept of consumption, its disposable income is always equal its savings; thus, the corporate sector figure for the propensity to save is not reported. Its growing savings rate can be attributed to its increased share in total disposable income (see Figure 6.10).

In contrast, the household and government sectors have shown a different picture. For the government sector, its share in disposable income has been steady, between 16% and 19% for most years (Figure 6.10); meanwhile there's been fierce fluctuation in the proportion of savings of the government sector (Figure 6.11). The propensity to save can be regarded as the major reason for the *U*-shaped growth of government savings. Fewer savings, however, can be related to higher spending. One possible explanation for the government's abnormal drop in 2000 and 2001 may be linked to the number of NPLs written-off at that time (see Chapter 5). At the end of the 20th century, the first and largest wave of NPLs write-offs occurred (see Table 3.7), when nearly 1,400 billion CNY worth of NLPs—fully financed by the central government—were transferred from the SOBs to the Asset Management Companies (AMCs). A second possible explanation is the changing attributes of the so-called "local government financing platform" or "local government financial vehicle." Normally, investment projects under the local government financial platform, for example, infrastructure investment in power, water, or transportation, are classified as undertaken enterprises. However, when the original Flow of funds statistics is compared with the 2012 revised version, it was found that the changes in the 2012 version were from a combination of increased government expenditures, increased corporate sector savings, and decreased government savings. Therefore, in the 2012 Flow of funds statistics, it is doubtful whether the investment under the local government-financing platform were classified under government expending.

For the household sector, a mixed situation occurred. The combination of decreased shares of gross disposable income (68.3% to 60.5%) and an increased propensity to save (29.5% to 40.3%) resulted in simultaneous growth in its saving rate and decrease in its share in total savings. The reason behind the declining income share has been explained by the continuous fall of the labor share in the national income (Ma & Yi, 2010). The increasing propensity to save from the household sector, however, could be interpreted as a circumstance of insufficient social security systems, such as education, healthcare, permanent jobs (iron rice bowl) and so on.

Along with enhancement in efficiency and improvement in financial performances of enterprises, the substantial increase in corporate savings in China can be explained by two other factors. The first is the difficulty in accessing external finance (that is, financial constraints), and the second is the low dividend payment by publicly listed Chinese firms, especially SOEs (Zhou, 2005). Listed SOEs are not required to pay dividends to the state, which is the SOEs' single largest shareholder, so a large part of net profits have become retained earnings, and thus, savings.

In Ito and Volz (2013), China's overall high savings rate is resulted by financial repression and negative real deposit rates especially since late 1990s. Financial constraints and lacking of financial means are also suffered by the household sector. However, on the other hand, Ma and Yi (2010) argued that China's high savings rate not only facilitates investment and serves economic development via low inflation and by avoiding external shocks, but it also helps in formulating China's investment-led growth model. A higher savings rate implies less consumption, and hence "a highly investment-incentive internal demand structure" (Ma and Yi, 2010, p. 6).

6.4 Banking loans

From the perspective of financial system development, in the practice of financial intermediation, the process of financing (transforming savings to investment) can be interpreted by the transition between deposits and loans. Breaking down loan and deposit portfolios from the banking sector can provide a detailed look at whether banks have performed well in delivering basic functions, such as mobilizing savings and channeling savings to facilitate credit demand for investment. It also helps to inspect the degree of disparity in the meaning of the term “financing” between the aggregated level, savings–investment circulation, and real banking practices. Disparities may imply possible distortions, for example, caused by efficiency loss that occurs in the conduction of financial activities.

The general features of financial development, from the aspect of monetization, were reviewed in detail in Chapter 4. To summarize those findings, the money supply in China’s economy is among the highest worldwide (see Table 4.1), and such rapid monetary expansion, with an average annual growth of more than 20%, was largely driven by the expansion of bank credit. This can be observed from the identical moving tendency between the annual growth of money and quasi-money (M2) and bank credit (see Figure 4.2).

Second, equity financing (financing through issuing corporate bonds and via the stock exchange) has shown an increased share in all methods of finance, though bank finance dominated the system until 2011, when more than 60% of total new financial resources supplied to the market were bank loans (see Table 4.2). An international comparison

showed that China's banking system provided more funds than most low- and middle-income economies, though China's was still lower, on average, than that of high-income economies (see Table 4.3).

Third, among the banking system, SOBs remained the single largest market player, though an upward market share occurred for both the JSCBs and CCBs (see Table 4.6). It is quite likely that the SOBs will retain their dominant position for the foreseeable future in terms of total assets. In 2011, nearly 45% of total banking assets belonged to the 4 SOBs, while the 13 JSCBs and 144 CCBs shared 20% and 9%, respectively (see Table 4.6).

From an institutional aspect, the influence of the state sector (the state government, SOBs, and SOEs) has been slightly undermined because the share of total bank credit allocated to the state sector declined, while the share of credit extended by non-SOBs increased (see Figure 4.7 and Figure 4.8). The interesting thing is that both SOBs and non-SOBs lend heavily to SOEs and other related state sector businesses. According to the findings in Chapter 5, given the improvement in efficiency and financial performances of industrial SOEs (see Tables 5.1 and 5.2), lending to SOEs became based on commercial criteria. The preference of lending to SOEs can be interpreted as a reflection of the outcome of a market-oriented, comprehensive loan approval process. The SOBs surpassed the profit rates of the JSCBs and CCBs (see Figure 5.7 and Figure 5.8), and industrial SOEs surpassed the non-state industrial sector surpassed in investment efficiency (see Figure 5.13).

The composition of all loans made by the banking system during the entire reform era appears in Figure 6.12. As aggregate loan data only became available starting in 1989,

the approach in Laurenceson and Chai (2003, p. 10) was followed: loan data from the SOBs, Rural Credit Co-operatives, Urban Credit Co-operatives (UCCs), and Trust and Investment Corporations (TICs) were totaled. It should be noted that aggregated loans data for the UCCs and TICs were available starting only in 1986. Additionally, because of the change in statistical standards, sectors with consistent data series are clearly marked in Figure 6.12. Inconsistent data has been classified under "Others," which includes: loan data of township enterprises (1997–2009); enterprises with foreign funds (1994–2009; other short-term loans (1997–2009); trusted loans (1997–2009); other loans (1985–2009); loans to urban collective enterprises (1980–1996); and loans to township enterprises and rural public institutions (1980–1988).

Figure 6.12 Composition of Chinese bank loans, 1980-2009, %

Source: Author's calculation. Almanac of China's Finance and Banking (various issues).

In reviewing the portfolio of bank lending, several changes can be observed. First, over time the term structure switched from short-term to medium- and long-term loans.

Starting at nearly 0% in 1980, by 2009 medium- and long-term loans accounted for more than 50% of banks' total loan portfolio. It is not clear whether the supply side or

the demand side affected this increase; most likely, it was both. The phrases "medium-term loans" and "long-term loans" were only introduced by the state after 1999, and efforts to trace loan data has shown that loans under these phrases were previously called "loan to fixed investment."[23] Medium- and long-term loans can be treated as loans channeled to finance investment in fixed assets; therefore, over the last 30 years, there was a tendency to channel bank credit to fund investment in fixed assets.

On the one hand, firms prefer stable and long-term financing to facilitate investment expenditures, given that an investment cycle is commonly longer than a production cycle. On the other hand, with the cost of liquidity, extending long-term credit to low-risk enterprises is favored by banks. One reason may be the underdevelopment of the non-bank financial market in China. Given the high degree of using retained earnings to finance fixed investment, which indicates a certain level of financial constraints faced by Chinese firms, without an advanced capital market to provide continuous and stable long-term funds for firms, long-term banking credit was the only alternative. According to Brandt and Zhu (2007, p. 124), the increasing role of medium- and long-term loans may also be the result of writing off NPLs, which are usually short-term loans.

The amount of bank credit flowing into the industrial and commercial sectors has declined gradually. Classified as short-term loans, these credits were treated as working capital. This is not to imply that the industrial sector received less support from the financial sector over the reform period. It is reasonable to think that most fixed investment are used by industries, so the falling share of credit for working capital and

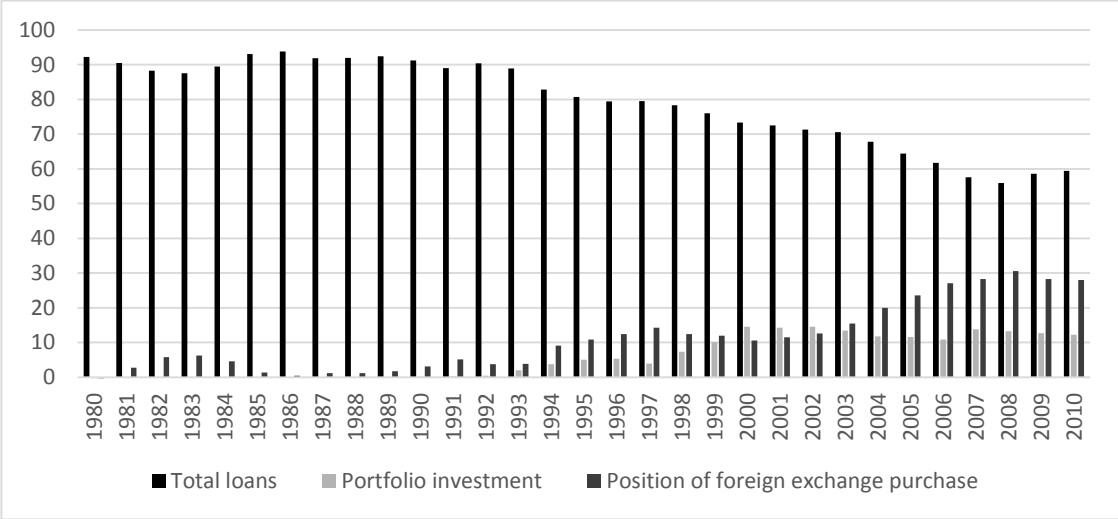
[23] The disaggregated loan data reported in 1999's Almanac of China's Finance and Banking traced a regenerated loan portfolio to 1994. Comparing data between 1994 and 1997 under two statistical standards, the quantity of "medium-term" and "long-term" loans equals "loans to fixed investment."

the rise in financing fixed investment may suggest that industrial enterprises prefer investments. For the commercial sector, the ongoing decrease in consumption expenditures in the national income, due to high investment rate, is a partial reason for why fewer loans are granted to the commercial sector.

A substantial amount of bank credit was granted to other sectors or through other loan-granting mechanisms. Because of the change in statistical standards in the accounting of bank loans, the “Others” category in Figure 6.12 mainly consists of loans to enterprises with collective or foreign ownership, and new loan types, such as trusted and entrusted loans, extended to non-bank financial institutions. Therefore, the share of “Others” loans is, to a certain extent, a reflection of financial diversification.

Comparing aggregated loans in the financial system with total use of funds of the financial sector, as illustrated in Figure 6.13, it is clear that most financial resources were allocated in the form of loan extensions. Portfolio investment saw solid growth starting in the early 1990s, with a stake of 12% of total application of funds by the end of 2010. More interesting is the rapid accumulation of foreign exchanges, also starting in the early 1990s. Responsible for 30% of all use of funds over the last several years, such a large composition of funds outstanding on foreign exchanges could weaken the total capacity of the Chinese financial system.

Figure 6.13 Composition of total use of funds, 1980–2010, %

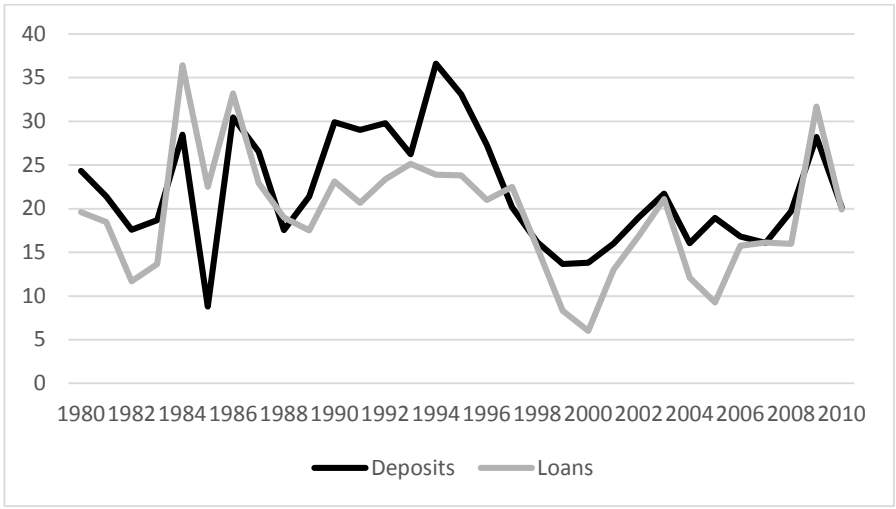


Source: Author's calculation. Almanac of China's Finance and Banking (various issues).

6.5 Savings deposits

From the supply side, rapid bank credit expansion over the last 30 years, as presented above, correlated to a rapid expansion of savings deposits. Furthermore, the high savings rate presented in the previous section indicates a high number of savings deposits. Total deposits held in the banking system, however, achieved an even higher annual growth than loan expansion (see Figure 6.14).

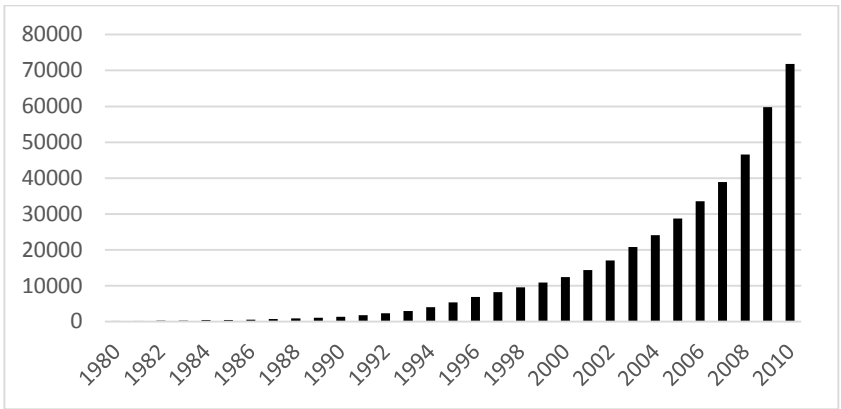
Figure 6.14 Annual growth rate of total loans and deposits, 1980–2010, %



Source: Author's calculation. Almanac of China's Finance and Banking (various issues).

As face value, a pattern that looks like an exponential curve on the deposits series, from less than 200 billion CNY in 1978 to nearly 60,000 billion CNY in 2009 (see Figure 6.15).

Figure 6.15 Total savings deposits, 1980–2010, billion CNY

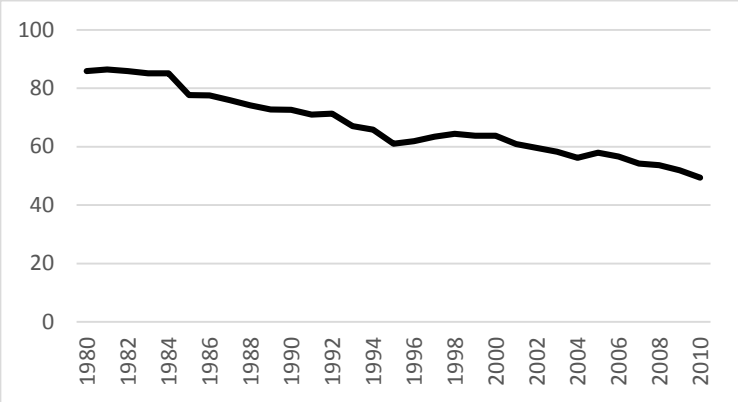


Source: Author's calculation. Almanac of China's Finance and Banking (various issues).

From an aspect of institutional comparison, the distribution of savings deposits changed from being concentrated in SOBs to a diversified allocation, which is similar to bank loans (see Figure 4.7). This thesis's estimation shows that the share of total deposits

held by the four SOBs declined, from more than 85% in 1980, to less than 50% in 2010 (see Figure 6.16), which confirms the growing competition among Chinese banks in absorbing deposits.

Figure 6.16 Share of savings deposits held in SOBs, 1980–2010, %



Source: Author's calculation. Almanac of China's Finance and Banking (various issues). The SOBs only include BOC, ICBC, BOA, and CCB, as the three policy banks do not accept deposits. Prior to 1985, deposits data for each bank is not available; this thesis adopted the deposits series from the aggregated table of state banks' sources of funds.

By decomposing total savings deposits from all the sources, additional information is illustrated (see Figure 6.17). There were mainly four sectors that contributed to total savings deposits: corporate, government, agriculture, and household. First, the corporate sector steadily contributed, on average, a share of 35% of total deposits annually. Although the majority of bank loans were granted to the corporate sector, a substantial number of corporate deposits may imply an inadequate supply of credit. Recalling the uncommonly high share of "self-raising funds" in investment in fixed assets (see Table 6.2), it is possible that those deposits saved by firms were used on other investment projects, given the difficulties in accessing more bank credit.

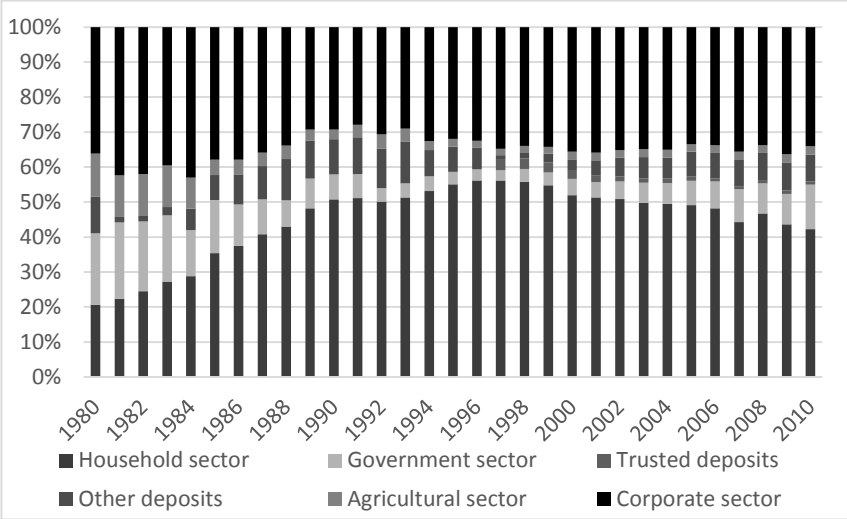
Deposits from the government sector, which include both fiscal deposits and deposits from government departments and organization, decreased during the first half of the

sample period, from 20% in 1980 to no more than 3% in 1997, which was its bottom. Since then, government deposits rose again, and in recent years, account for a stake between 9% and 10%. This increased share is a result of China's re-adoption of an expansionary fiscal policy starting in 1998, against the background of the Asian financial crises (Lin, 2011, p.78)

Substantial expansion of savings deposits can be found only in the household sector, which became the largest sector saver in 1987, the year when a higher composition of total deposits from the household sector over the corporate sector was recorded. Since then, the proportionate share of household deposits gradually increased, and reached its peak in the late 1990s. Although in the 21st century there has been a slightly downward trend in the share of household deposits, this sector continues to hold the dominant position. For the household sector, savings are largely represented in the form of savings deposits, therefore the changing share in household sector total deposits can be understood as a combined effect of a 10% decrease in its share of national disposable income and a 10% increase in the propensity to save (see Figure 6.10 and Figure 6.11).

The agricultural sector was the only sector that recorded a gradual declining share in deposits, from 12.4% in 1980 to 2.4% in 2010.

Figure 6.17 Composition of savings deposits, 1980–2010, %



Source: Author's calculation. Almanac of China's Finance and Banking (various issues). Deposits of the government sector are defined as the sum of fiscal deposits and deposits of government departments and organizations.

6.6 Summary

In this chapter, from the aspect of both source and use of funds (meaning the supply and demand sides of finance), an examination of investment and savings, and bank loans and savings deposits in aggregated terms, was undertaken. A financial pathway, where funds flowed from the household sector (major depositor) to the corporate sector (major user) was illustrated; this flow highlights the potential role of financial intermediation in channeling financial resources across sectors under the China context. From this chapter it is clear that from both the supply side and demand side of finance, and from the angle of SOEs and SOBs, the state has had a decreasing influence in the economy.

The term "finance" describes the process of financing investment; that is channeling savings into investment projects. Along with emphasizing both supply and demand sides of finance, an important task is assessing financial interactions. The analysis in this chapter provided a comprehensive foundation for the analysis presented in Chapter

7. That chapter focuses on the causal directions between savings and investment, and deposits and loans, by emphasizing the allocative efficiency and productive efficiency views of financial development in China, from the mainstream doctrine and the Keynesian–Schumpeterian view of endogenous finance, respectively. Without an ample assessment of the evolving features and characteristics of investment, savings, loans, and deposits in post-1978 China, an analysis of the savings–investment nexus and deposits–loans nexus would be fragile and inadequate.

Table 6.6. Investment financing classified by ownership, 1985-2003, %

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
SOEs																			
State budget	26.42	23.68	20.55	14.67	13.36	13.21	10.23	6.30	5.96	4.95	4.94	4.61	4.69	7.09	9.98	10.79	12.59	14.24	10.41
Domestic loans	23.04	22.74	24.56	24.20	20.85	23.62	28.06	30.37	25.44	25.58	23.39	23.58	23.05	23.48	23.98	26.11	23.70	24.39	25.67
Foreign investment	2.83	4.97	7.33	8.96	10.15	9.11	8.34	7.99	6.08	7.14	7.80	6.71	5.08	4.37	3.93	2.50	2.01	2.20	1.57
Self-raising	40.43	38.43	38.20	40.49	42.80	42.15	43.11	46.60	48.01	50.77	48.15	50.79	52.88	50.30	47.74	46.93	49.10	47.81	50.75
Others	7.29	10.18	9.37	11.68	12.84	11.91	10.26	8.74	14.51	11.57	15.71	14.32	14.29	14.75	14.37	13.67	12.60	11.37	11.61
Collective-owned																			
State budget	1.47	0.55	0.62	0.68	0.51	0.42	0.28	0.13	0.15	1.87	1.68	1.42	1.76	2.15	5.56	6.54	5.44	6.87	4.16
Domestic loans	37.60	38.00	40.42	36.27	26.71	27.50	31.67	36.72	31.00	27.83	25.31	20.48	17.41	14.89	13.23	12.15	10.95	10.56	11.41
Foreign investment	0.89	0.99	1.28	1.59	2.94	2.32	1.96	2.65	5.73	8.07	6.22	8.17	7.21	6.23	4.42	3.91	3.29	4.46	4.95
Self-raising	60.04	47.31	39.13	41.64	47.97	47.66	45.84	39.67	42.24	19.17	54.80	55.30	59.71	55.63	63.48	65.63	58.92	68.53	71.65
Others		13.16	18.54	19.82	21.87	22.10	20.26	20.82	20.88	43.07	11.99	14.63	13.91	21.11	13.30	11.77	21.39	9.58	7.83
Private-owned and others																			
State budget	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.38	0.36	0.27	0.15	0.33	0.71	0.69	0.72	0.60	0.42
Domestic loans	0.00	6.08	6.34	0.00	3.43	3.58	4.49	4.21	7.30	9.36	10.35	11.17	12.24	14.22	12.65	14.95	16.26	17.80	19.28
Foreign investment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65	1.63	1.83	2.05	2.64	3.03	1.80	2.03	1.33	1.35	0.91
Self-raising	100.00	83.60	82.08	100.00	96.57	84.60	84.08	84.10	77.30	83.66	79.86	78.83	77.20	68.22	70.85	61.55	60.38	52.02	54.88
Others	0.00	10.32	11.57	0.00	0.00	11.82	11.43	11.69	14.64	4.96	7.60	7.69	7.78	14.20	13.99	20.78	21.32	28.23	24.51
Foreign-funded																			
State budget	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.31	0.30	0.26	0.25	0.25	0.15	0.08	0.21	0.14	0.17	0.08
Domestic loans	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.82	17.18	15.92	15.02	14.80	14.83	18.92	19.70	18.29	19.24	19.29
Foreign investment	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	38.60	46.90	47.78	52.22	51.80	48.02	39.46	31.91	30.80	29.22	29.24
Self-raising	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	28.04	26.12	21.83	20.04	20.10	21.63	24.13	27.42	30.55	31.33	33.79
Others	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.22	9.50	14.20	12.48	13.04	15.37	17.40	20.75	20.21	20.04	17.61

Source: Author's calculation. China Statistic Yearbook (2012). The data of foreign-funded enterprises became available only in 1993. Before 1993, the category "private-owned and others" included individual-owned enterprises. After 1993, it also included firms with joint ownership, shareholding enterprises, and other firms.

Table 6.7 Investment Financing classified by source of funds, 1985–2003, %

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Distribution of State budget																			
SOEs	98.93	99.55	99.29	98.81	99.15	99.42	99.47	99.47	98.38	87.54	87.75	88.44	87.94	90.25	84.00	81.50	84.97	83.50	83.65
Collective-owned	1.07	0.45	0.71	1.19	0.85	0.58	0.53	0.53	0.72	9.47	9.05	8.43	9.82	7.71	13.19	15.11	11.44	13.16	12.57
Private-owned and others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	1.97	2.17	1.98	1.12	1.67	2.69	3.11	3.40	3.12	3.62
Foreign-funded	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.52	1.02	1.03	1.15	1.12	0.38	0.12	0.29	0.19	0.22	0.16
Distribution of loans																			
SOEs	75.87	70.49	67.51	71.77	73.80	79.17	78.79	74.41	66.59	64.69	61.40	62.30	62.90	64.55	65.28	61.84	56.26	51.02	46.06
Collective-owned	24.13	23.32	26.45	28.23	21.25	16.72	17.10	23.20	23.64	20.16	20.21	16.69	14.17	11.54	10.16	8.80	8.10	7.22	7.70
Private-owned and others	0.00	6.19	6.04	0.00	4.95	4.11	4.11	2.39	4.45	6.84	9.18	11.36	13.36	15.55	15.58	20.95	27.04	32.94	37.23
Foreign-funded	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.31	8.31	9.21	9.65	9.57	8.36	8.98	8.40	8.60	8.81	9.02
Distribution of Foreign investment																			
SOEs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	51.28	37.81	37.43	29.52	24.71	25.44	30.51	23.50	20.00	19.54	13.03
Collective-owned	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14.09	12.24	9.08	11.09	10.46	10.23	9.69	11.25	10.17	12.96	15.47
Private-owned and others	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.29	2.49	2.96	3.47	5.13	7.01	6.34	11.28	9.24	10.61	8.17
Foreign-funded	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	33.35	47.45	50.52	55.92	59.70	57.32	53.46	53.97	60.58	56.89	63.33

Source: Author's calculation. China Statistic Yearbook (2012). The data on foreign-funded enterprises became available only in 1993. Before 1993, the category "private-owned and others" included individual-owned enterprises. After 1993, it also included firms with joint ownership, shareholding enterprises, and other firms.

Chapter 7

Financial development from the perspective of allocative and productive efficiency: savings–investment reconsideration

7.1 Introduction

This chapter concentrates on the interactions, or the transmission mechanisms, between (a) savings and investment from a macro view, and (b) loans and deposits from a middle view. It also discusses the relative efficiency attributes involved in each interaction.

As argued in Chapter 2, different theoretical schools emphasize different causal directions between savings and investment. In the neoclassical tradition, the concentration is on market frictions involved in the process of transferring savings into investment funds through financial intermediations. The alternative literature—the endogenous finance view from the Keynesian-Schumpeterian school—emphasizes banks' ability to create credit; hence, how investment dynamically interacts with the real sector development to generate new savings. A causal relationship from deposits to loans, and from savings to investment is held by the mainstream finance-growth theory. A reverse causal direction is advocated by post-Keynesian theorists.

7.2 Savings and investment, theoretical perspectives

Starting from a typical neoclassical setting, for example, the Solow model, economic

development is delivered not only through productivity growth and labor growth, but also through capital accumulation, which is determined by investment. The key factors that determine the speed of capital accumulation, that is, the productivity of capital, are assumed to be exogenous. Various resources, such as capital stocks, savings, and the saving rate, are also assumed to be exogenously determined endowments. Accordingly, the level of investment is largely constrained by the financial endowments of the economy, for example, the propensity to save. From a neoclassical perspective, the level of investment is thus constrained and largely determined by savings and the saving rate, which guide the capacity of the financial system in facilitating and financing potential investment. With the process of transforming savings into investment, there is no need either for money or banks, if the (unlikely) presumption of a perfect competitive market with no market frictions is held. It is not until the introduction of the theory of transaction costs that the importance of banks, as well as financial markets—or more broadly, financial intermediations—is raised via allocation of savings into investment: the process of financial investment.

By synthesizing the theory of imperfect markets (which emphasizes the existence of market frictions) with the finance-growth theory, it is argued that expertise in financial intermediations will highlight investment projects with high returns but low risks, which will lead to access to bank credit.[24] Only with the support of the financial system can more efficient allocation of financial resources and more effective investment be achieved.

This account is largely held in recent versions of finance-growth theories that are based

[24] Market frictions include, for example, transactions cost and the costs of informational asymmetry. Financial intermediations include, for example, mobilizing savings or monitoring and improving corporate governance.

on endogenous growth theories, with an endogenous financial sector. In this school of thought, a representative simple AK model developed by Pagano (1993) derived the rate of economic growth using the following equation: $g = A\emptyset s - \delta$, where *A* measures the level of technology (the marginal productivity of capital), $\emptyset$ equals the degree of market frictions involved in the financing process, *s* denotes the saving rate, and δ means the depreciation rate over certain periods. From this equation, economic development delivered through financial development is jointly affected by two factors: a higher saving rate and ameliorated market friction during the financing process.

In order to ease market frictions and achieve more efficient financial resource allocation, financial development is carried out through improvements in several functions, such as better savings mobilization, more efficient monitoring of corporate governance, and better risk diversification. The major mechanism, however, is assumed to be market competition. In the context of financial development in China, the elimination of market frictions has been emphasized through the introduction of non-state attributes, such as enlarging the market share of non-state-owned financial institutions or shifting the lending standard of financial institutions from a preference of lending to state-owned enterprises (SOEs) to more commercial enterprises.

While this has been discussed in detail in previous chapters, what is worth mentioning here is that the existence of pre-determined and known quantity of total financial resources is a pre-condition. This could be, for example, total social savings that guide the maximum capacity of the financial system and set the cap for potential investment. Along with affecting each sectors' propensity to save, the assumed role of easing and correction of market frictions implies that financial intermediations can deliver more efficient conversion only from savings into investment, and that no further interaction is

expected between the financial sector and capital accumulation.

According to the representative agent approach in the neoclassical tradition, there are no assumed differences between institutions with different properties that are acting as financial intermediaries. Two extended interpretations can be made. First, a private investor or private funds provider is recognized as delivering the same function as formal financial institutions, such as banks. The only difference is their capability. Second, the presence of a central bank is largely neglected, which implies the fundamental function of banks—money creation—is not considered.

If we take a look from the demand side of finance, the post-Keynesian theory of endogenous finance starts from the willingness of entrepreneurs to invest and how the financial sector satisfies the needs of investment; this is the supply side (Lavoie, 2006).

On the supply side, closer interaction between financial investment and real sector development is emphasized, in which investment not only contributes to capital stock accumulation, but also stimulates effective aggregate demand (Nell, 1992). Any income expansion that resulted from investment in the previous period would thus influence the direction of gross savings in the current period. That is to say, the nexus between finance and development is based on a causal linkage from investment to savings.

The role of the financial system in this circulation shifts from easing market frictions to creating money and credit “out of nothing” (Herr, 2010). From the aspect of efficiency attributes, the neoclassical view of finance and growth takes the position of generating more efficient use of given quantities of available financial resources, such as maximizing the return on investment at each time period. However, the alternative view

concerns a dynamic process of continuous economic capacity enhancement driven by credit expansion. In other words, it implies increasing the output-to-input ratio, rather than maximizing the output (return on investment) in each period, otherwise known as productive efficiency (Lo et al., 2011, p. 269).

Using this framework, the financial system's ability to create money and credit thus becomes the driving element in delivering productive efficiency. From the Keynesian-Schumpeterian view of banking and finance, the financial system, especially banks, have two major unique characteristics that are different from other economic agents. The first is that there are at least two tiers in a financial system: the central bank is the upper tier, and other deposit-taking, loan-extending banking institutions (which link borrowers and lenders) constitute the lower tier (Dullien, 2009, p. 10). The second characteristic is that the function of creating credit can only be performed by banks.

The underlining presence of the central bank, as raised in the first point, is crucial in explaining how financial institutions can create bank credit without a savings prerequisite. After the entrepreneurs' willingness to investment in projects and commercial banks granting credit to finance the projects, the next step is a refinancing process from the central bank to commercial banks. By providing base money to the lower tier, the central bank accommodates the liquidity requirement and credit expansion of commercial banks. However, the debate of whether or not the central bank can fully or partially accommodate banking sector money expansion by extending loans remains in the post-Keynesian school (see Moore, 1989, 1998; Rousseas, 1989, 1998). Only with collaboration between both tiers, by means of supplying base money, can credit be created. This leads to the second characteristic raised above.

The Keynesian-Schumpeterian view of finance takes the transforming process between savings and investment as a dynamic circulation, not a single-round interaction. Investment projects financed by banking sector credit contributes to capital accumulation and generates new capacity in the economy, and, thus, creates additional savings. It does not mean that market frictions involved in the financing process are not important; as a matter of fact, the financial sector simultaneously generates allocative and productive efficiencies. However, in any given time period, policy-makers could be inclined to enhance one efficiency over the other, creating a trade-off between both efficiencies (Lo et al., 2011, p. 279). In this case, Lo et al. (2011, p. 279) emphasized that different growth paths, for example short-term optimization and long-term development, were behind the allocative and productive efficiency views of financial development. Both efficiencies can explain part of China's success, though in different periods and different stages of reform; the emphasis is always shifting.

7.3 Deposits and loans, from the scope of banking practice

When put into banking practice, stylized T-accounts are used to illustrate the difference between the two theoretical traditions, from a deposit–loan aspect.

In Table 7.1, the financing process starts with the endowment of the economy, which is reflected by household sector wealth. For simplicity, it is assumed that the household sector holds 100 units of money deposited at a bank (step 1). In order to achieve more efficient use of funds provided by the household sector, the banking sector, in the role of financial intermediary, then applies various technologies to eliminate transaction costs and asymmetric information, given the imperfection of the market. In step 2, deposits from the household sector are transformed into loans that are granted for particular

investment projects from selected firms, in the form of firm’s deposits at the bank. The final step occurs when the firms use the loans extended by banks to invest in projects, which is reflected by the addition of capital good.

Table 7.1 T-accounts of financing investment, mainstream approach

Financial institution

Assets			Liabilities		
Step 2	Loan to Firm	+100	Step 1	Deposit from household	+100
			Step 2	Deposit from firm	+100
			Step 3	Deposit from firm	-100

Household

Assets			Liabilities		
Step 1	Deposit at bank	+100	Step 1	Household wealth (endowment)	+100

Firm

Assets			Liabilities		
Step 2	Deposit at bank	+100	Step 2	Bank loan	+100
Step 3	Deposit at bank	-100			
Step 3	Capital good	+100			

Source: Dullien (2009, p. 11).

During the entire process, the financial sector's upper limit in financing investment is determined by the endowment of the economy, which is in the form of household deposits. It should be pointed out that this leaves no room for the central bank.

The Keynesian-Schumpeterian view of banking and finance begins with firms' requirement of bank credit (see Table 7.2). As in step 1, even though there is no deposit held by the bank in advance, issuing credit to the firm can still keep the bank's assets and liabilities in balance. The most important thing for the second step, in order to fulfill credit expansion and keep liquidity, is that commercial banks must ask the central bank for an injection of base money. Assuming that the reserve requirement is set at 100% of the bank's total deposit, in the second step—through open market operations or other instruments—the central bank re-finances the commercial bank by booking the credit to the commercial bank as assets and the reserve created as liabilities. Commercial banks book their accounts in the opposite way. Up to this point, investment has been financed from credit created "out of nothing." In step 3, firms' production of capital goods are recorded, and households earn income by providing human capital (workers) in the production process, thus generating new deposits for the bank.

Table 7.2 T-accounts of financing investment, Keynesian-Schumpeterian approach

Financial institution

Assets			Liabilities		
Step 1	Loan to Firm	+100	Step 1	Deposit from firm	+100
Step 2	Reserve at central bank	+100	Step 2	Loan from central bank	+100
			Step 3	Deposit from firm	-100
			Step 3	Deposit from household	+100

Firm

Assets			Liabilities		
Step 1	Deposit at bank	+100	Step 1	Bank loan	+100
Step 3	Deposit at bank	-100			
Step 3	Capital good	+100			

Household

Assets			Liabilities		
Step 3	Deposit at bank	+100	Step 3	Household wealth (new income)	+100

Central bank

Assets			Liabilities		
step 2	Loan to bank	+100	Step 2	Reserve	+100

Source: Dullien, 2009 (p. 11).

According to this financial investment mechanism, the role of the central bank is emphasized, and collaboration between the both upper and lower tiers of the financial system is key to facilitating investment without compulsory pre-existing deposits. However, the financial system still faces the issue of identifying high return–low risk investment projects in order to obtain higher returns on investment. While technology constraints and market friction continue to play important roles in the financing process, emphasis is more on expanding available financial resources than on capacity.

7.4 Savings and investment, evidence from the perspective of financial development

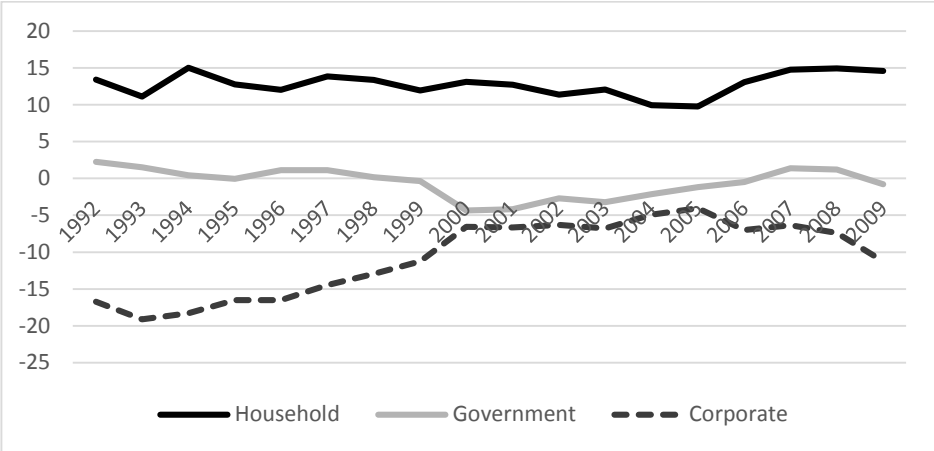
The two theoretical perspectives provide different scopes to assess the relationship between savings and investment and between deposits and loans. In this section, a detailed savings-investment nexus (S-I nexus) and deposits-loans nexus (D-L nexus) are assessed.

The Flow of funds statistics, which was available between 1992 and 2009, provide some insights into China's S-I nexus by breaking down aggregate data into sectors (see Figure 7.1). Theoretically, the decision to save or invest is undertaken independently by economic entities for different purposes. According to national income accounting, the difference between savings and investment equals the balance of current accounts; that is, total export minus total input: $\mathrm{S}-\mathrm{I}=(\mathrm{X}-\mathrm{M})$. As both S and I can be decomposed into sectoral levels, the equation $\mathrm{S}-\mathrm{I}=(\mathrm{X}-\mathrm{M})$ can be derived as

$$(S_H - I_H) + (S_G - I_G) + (S_E - I_E) = (\mathrm{X}-\mathrm{M}) \quad \text{(Eq. 7.1)}$$

In this equation, H is the household sector, G is the government, and E reflects the aggregate of both financial and non-financial enterprises.

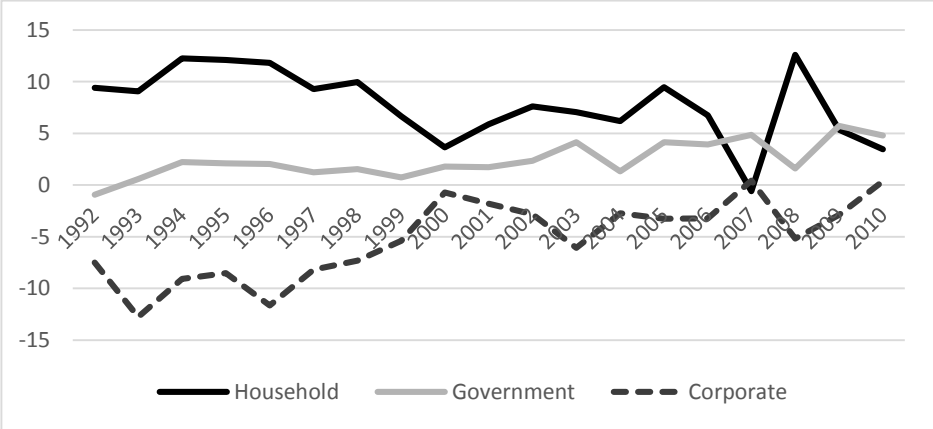
Figure 7.1 S-I/Y by sector, 1992–2009, %



Source: Author's calculation. China Statistic Yearbook (2012); National Bureau of Statistics of China (2008). S = savings; I = investment; Y = year.

In Figure 7.1, the household sector is the only net saver. Over the sample period, the net savings contributed by this sector was between 10% and 15%. Unlike the finding that suggested the government sector saved more than it invested (see Riedel et al., 2007, p. 46), this thesis found that, starting from 2.2% of GDP, the S-I balance of the government sector decreased between1992 and 2000, and only recovered its initial level between 2007 and 2008. The net deficit of government S-I balance, especially between 1999 and 2006, implies that government investment expanded faster than its savings accumulation. The corporate sector is the only net borrower among the three sectors, and is it mainly financed by the household sector. Further, financial transactions confirms that funds mainly flow from the household sector to the corporate sector; though from the deposits-loans view, the government sector tends to be a net saver (see Figure 7.2).

Figure 7.2 D-L/Y by sector 1992–2010, %



Source: Author's calculation. China Statistic Yearbook (2012); National Bureau of Statistics of China (2008). D = deposits; L = loans; Y = year.

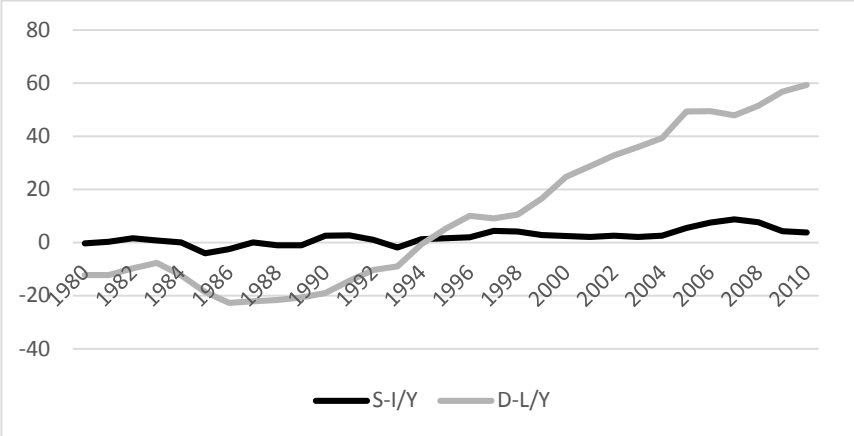
The similar moving tendencies of both the sectoral savings–investment balance and deposits–loans balance further address the importance of financial development in facilitating resources allocation across sectors in the economy. The S-I balance can be interpreted as the changing dynamic between aggregate supply and demand, while the D–L balance can be seen as the performance of the financial sector in achieving its role as the financial intermediation. The more substantial fluctuation of the D-L balance curve in terms of GDP, compared with the S-I curve, suggests that financial activities such as savings deposit mobilization and loan granting are crucial in determining the macrobalance of the Chinese economy.

From the Keynesian-Schumpeterian view of finance, by creating credit to finance investment projects, the financial system made great strides in stimulating effective demand. In this way, the S-I gap can be understood as the inadequacy of investment, given that savings are affected by the change in aggregate effective demand. A much narrower S-I gap reflects the better match between aggregate supply and effective demand, suggesting a more efficient monetary circulation and overall efficiency of economic activities.

From the allocative efficiency view of finance, investment is a function of savings. This means the quantity of mobilized deposits determine the supply of loans. Therefore, both S-I and D-L balances suggest changing lending behaviors of the financial system: a negative S-I and D-L gap implies excessive supply of funds, a positive S-I and D-L gap indicates a more sophisticated investment selection process. This process can include credit rationing or the application of prudential lending criteria, as financial institutions improve how financial resources are allocated for more efficient use.

Both S-I and D-L balances, in terms of GDP, are illustrated in Figure 7.3. From the moving tendency of both balances, two phases can be distinguished: the pre-1995 period and post-1995 period. In the first phase, which ran from 1980 to 1994, the S-I gap fluctuated up and down, so both positive and negative numbers have been recorded. The D-L balance remained negative throughout this period, though in the mid-1980s the D-L gap gradually narrowed. Year 1995 can be seen as the turning point as both gross savings and the stock of deposits began to exceed investment and total loans stock; no further negative value was recorded. During the second phase, from 1995 onward, despite fluctuations, a major positive tendency can be observed on both S-I and D-L curves.

Figure 7.3 S–I balance and D–L balances, 1980–2010, in terms of GDP, %



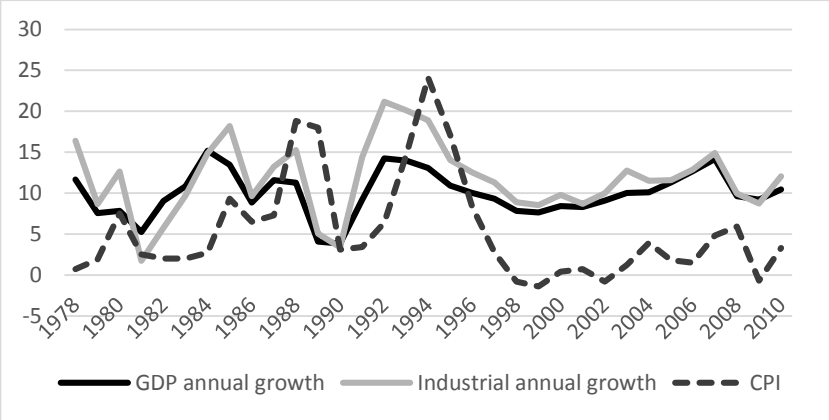
Note: Author's calculation. China Statistic Yearbook (2012); Almanac of China's Finance and Banking (various issues). S = savings; I = investment; D = deposits; L = loans; Y = year.

Before analyzing the interaction between the financial system and real sector development in detail for both the pre- and post-1995 periods, several features of China's economy throughout the reform periods needs to be highlighted.

The first feature is the "stop–go," or "boom–bust," aspect of China's economic development (Brandt & Zhu, 2007, p. 94; Lo et al., 2011, p. 277). Economic development in China has experienced several of these cycles over the past 30 years, which implies both excessive expansions and contractions during the sample years (see Figure 7.4**)**. Furthermore, it is quite clear that the most violent fluctuations occurred in the first half of reform, before 1995. The mid-1980s, mainly 1984 to 1986, and the early 1990s witnessed the entire economy overheating, which was largely related to the credit boom occurring at these times. Figure 6.14 showed that the annual growth of total loans extended by the financial sector during these two periods was over 25%. In the neoclassical tradition, a "stop–go" development path implies resource misallocation, given that during an expansionary period, all investment projects, including those with low returns and high risks, were issued as bank credit. At the contractive period, even

high return–low risks investment projects crowded out the capital market. However, from the Keynesian–Schumpeterian tradition, the interpretation could be different. The "stop-go" cycle that driven by the development entrepreneurship would suggest a certain process of creative destruction.

Figure 7.4 Economic growth and inflation, 1978–2010, %



Source: National Bureau of Statistics of China (2009); China Statistic Yearbook, (2012). There is no composite CPI before 1985; the data applied before 1985 is CPI in the urban area.

The second feature is the evolving role of the banking system in the process of economic development. Although independent status was given to the four state-owned commercial banks (SOBs) during the first half of the 1980s, and the second half of that decade witnessed the establishment of the two-tier financial system with the People's Bank of China (PBOC) (discussed in detail in Chapter 3), the primary objective of the system has remained as a kind of quasi fiscal agency of the central government. The PBOC and the four SOBs were de-centralized and the influence from local governments remained. A contradiction appeared because a centralized structure, as the alternative to a fiscal agency, was vital for the financial system to perform its income redistribution function. At the same time, decentralization stimulated banks to earn higher profits by allocating credit to more efficient firms. If banks' major function was to allocate credit

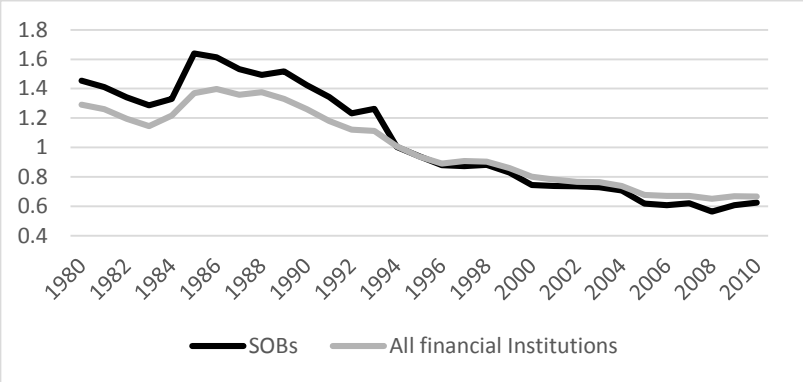
to profit-making investment projects, the only way to keep performing its redistribution role was to continuously re-finance from the central bank. This behavior was a significant factor in the "stop–go" cycles (see Brandt and Zhu 2007, p. 97).

As a reminder of the events in Chapter 3, at the end 1994 and the beginning of 1995, the Commercial Banking Law and Central Banking Law were promulgated by the central government. The four SOBs were legally defined as commercial banks, and their role as redistribution agencies was gradually removed. To take over commercial banking duties, first, three development banks were founded in 1995 by the central government, and each bank handled different specialized business areas. Second, the financial system procedures were recentralized in the late 1990s, in which a vertical management structure was introduced to both the PBOC and the SOBs. The key event during this process was the restructuring of the PBOC in 1998, which largely disassociated local governments from the PBOC. Third, the state credit plan was abolished in 1998; from that point forward, the SOBs were granted more autonomy in their lending practices.

Throughout these reforms, there have been considerable changes in both the central government's focus of the financial system and the SOBs' lending behaviors. Figure 7.5 shows that for the pre-1995 period, the SOBs had greater credit expansion than the average level of the financial system. However, starting in 1994 and continuing, the SOBs became more conservative as financial intermediaries than the average of other financial institutions. The recommercialization of the SOBs during the second half of the reform phases gave them room to improve their ability to allocate financial resources more efficiently by following a more market-based lending criteria. However, this same recentralization weakened the SOBs' activities in credit expansion. As a matter of fact, in late 1990s, when the SOBs began to show strong contraction in loan

extension, due to the introduction of prudential banking regulations, a rare deflation period—from roughly 1996 to 2002—was observed in China (Lo et al., 2012, p. 20). In other words, the insufficient supply of credit created insufficient effective demand.

Figure 7.5 Loan-to-Deposit ratio comparison, SOBs to financial sector, 1980–2010

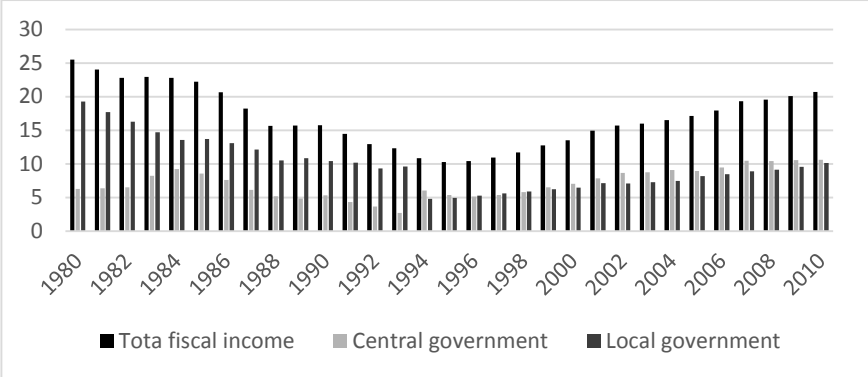


Note: Author's calculation. Almanac of China Finance and Banking (various issues). SOBs defined as the aggregation of the four SOBs. Separate loan and deposit data for each SOB prior to 1985 is not available; author adopted the series from the aggregated table of state bank's sources of funds.

A third feature is that the fiscal reforms in 1994 provided a solid foundation for the changing objectives of the financial system. From 1980 to 1993, total fiscal revenues, in terms of GDP, declined sharply from more than 25% to around 10%; clearly, local governments took a larger stake than the central government (see Figure 7.6). The traditional revenue remittance system, adopted during the pre-1995 period, was largely through negotiations on a case-by-case basis (Naughton, 2007, p. 432). This means that not only were the revenue-retention rates negotiated between government and enterprises, but also that the share of total fiscal revenues were negotiated between the central and local governments. As local governments tended to preserve their development projects at the local level, they were reluctant to impose heavier taxation on enterprises, especially the state-owned enterprises (SOEs). This behavior can be observed in the decreasing share of total fiscal revenues in national income and, more

importantly, the insufficient fiscal income of the central government.

Figure 7.6 Share of fiscal revenues in national income, classified by government level, 1980–2010, %



Source: China Statistic Yearbook (2001); China Statistic Yearbook (2012).

This insufficient fiscal income explains why prior to 1994 the central government relied heavily on the financial system to redistribute income. It is reasonable to argue that if the situation in fiscal revenues had remained unchanged, additional financial sector reform would have received very little effort, as banks could not pursue more commercial-based objectives.

The effect of fiscal reforms, such as the taxation reform in 1994, is obvious from introduction of new taxes (e.g., VAT) and a new tax sharing system between local and central governments. Total fiscal income began to climb, and by the end of 2010, fiscal revenue contributed to more than 20% of GDP. Furthermore, the relationship between the central and local governments was rebalanced when revenue sharing was switched from a negotiation process to a tax-basis one. Starting in 1994, total fiscal revenues shared by central and local governments tend to be equal (see Figure 7.6).

Linking the changing role of the financial system and the central government's fiscal

reforms for the pre-1995 period, the inefficiency of the SOBs in properly allocating resources was largely due to continuously acting as quasi fiscal agencies. However, the central government had no choice but to rely on the financial system to redistribute income, given its weak position in revenue-sharing negotiations with local governments. The recentralization of the financial sector itself, as well as the recentralization of the fiscal and taxation systems, laid the foundation for the financial system to improve its investment efficiency. Without such complementary reforming events, the central government would be forced to use excessive lending to adjust macro balances between aggregate supply and effective demand. From this aspect, banking sector credit expansion effectively rebalanced aggregate supply and effective demand, as observed by an S-I balance that remained around 0, and by the steady, even increasing, D-L gap between 1980 to early 1990s (see Figure 7.3).

A fourth feature is SOE reform. The most important of these was ownership reform, which mainly occurred between 1998 and 2000, nearly as important was what occurred at the Third Plenary Session of the 14th CPC (Communist Party of China) Central Committee in November 1993, when the concept of establishing a modern enterprise system in the SOEs was raised. Following that meeting's approval of the "Decision of the Central Committee of the Chinese Communist Party on Setting Up the Socialist Market Economic System," the National People's Congress later that year promulgated the Company Law, which legally defined SOEs as corporations.

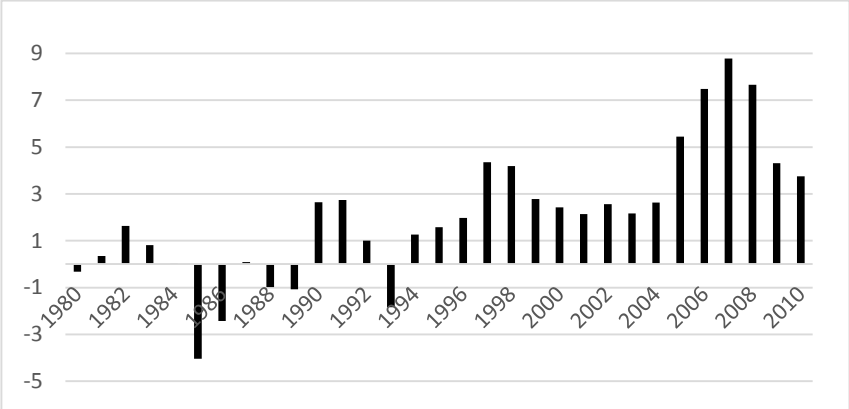
The conversion of SOEs into modern corporations through a uniform legal framework not only laid the foundation for further shareholding and public listing reforms, but it also granted deeper autonomy to SOEs. First, introducing a modern enterprises system with reference to Western experience largely improved the operational efficiency and

corporate governance of the SOEs, as profitability became a higher priority. Second, being defined as corporations implied the feasibility of ownership restructuring. By selling shares to private enterprises or oversea strategic investors, for example, SOEs benefitted from diversification of ownership by drawing on the advanced knowledge and experiences of modern company management. Small, and especially insolvent, SOEs were privatized, and some were shut down, as would happen with Western corporations.

As argued in previous chapters, it was only since 1998, when the principle of *Zhua Da Fang Xiao* was adopted, that significant profitability and productivity occurred in the SOEs. As SOE reforms were initially designed only in late 1993 and early 1994, it should be pointed out that it took longer for SOE reforms to produce significant effects when compared with the financial sector and fiscal reforms., However, given the time it took to transmit from micro to macro, that is, from banking credit provision to aggregate effective demand, the SOEs' gradual reform further suspended such transmission mechanism.

In order to accommodate this gradual reform, the financial system, especially the SOBs, were required to retain market-supplanting elements, including credit plans and policy lending, rather than immediately switching to a development path based only on market criteria. However, the limited progress of SOE reform in the mid-1990s and the continuous support from SOBs in the late 1990s helped stimulate effective demand with developmental attributes. Figure 7.7 charts the S-I rebalancing between 1998 and 2004, which happened through accommodation between the SOEs and SOBs. This shows that the pace of the reforms of the SOEs and SOBs were mutually connected.

Figure 7.7 S-I/Y of the Chinese economy, 1980–2010, %



Source: China Statistic Yearbook (2012). S = savings; I = investment; Y = year.

Generally, financial sector reforms were largely constrained by the reform progress in other sectors. First, the changing behavior of the banking system not only depended on the reform progress of the SOBs, but also on the consequences of fiscal and SOE reforms. Second, neither fiscal nor SOE reforms could have occurred smoothly if the financial sector reform had stagnated. Although recentralization of the financial system (that is, PBOC restructuring) and the new revenue-sharing system weakened local governments' ability to raise funds and facilitate local investment, other financial reforms had the opposite effect. Diversification in the financial system, for example with the establishment of City Commercial Banks (CCBs), of which local governments were usually the largest shareholders, provided new channels for local government to meet their own targets.

In the first round of reforms, the SOE reforms largely released the SOBs to pursue profit-oriented targets. In the second round, market-criteria-based lending standards of the financial system made strong externalities and induced the SOEs to pursue improvements in corporate governance, operational efficiency, and financial conditions.

A fifth feature is the external position of the Chinese economy. Increasing savings

surplus that caused increasing S-I gap, on the other hand, also implies the surplus of China's current account. The pursuing of an export-led growth path by the central government since mid-1990s stimulated disposable income through a process of income creation by introduction external demand. The increasing in disposable income, however, did not smoothly transfer into increasing consumption but increasing savings. As argued in Chapter 6, this could be largely resulted by financial repression policies and insufficient social security systems in the Chinese economy. In other words, it was insufficient domestic effective demands that resulted such enlarging S-I gap. From this perspective, China's high investment rate is not high enough: it is inadequate investment that leads to insufficient effective demand.

7.5 The interaction between allocative efficiency and productive efficiency

With the four features detailed above as background, this section examines the S-I and D-L balances of China's economy from a financial development aspect. It does this by emphasizing allocative efficiency and productive efficiency. Given the importance of 1994, which witnessed dramatic changes in both S-I and D-L balances from negative to positive, it can be argued that 1994 was the turning point for the different phases of financial development.

7.5.1 Pre-1995

Between 1980 and 1994, the S-I curve fluctuated no more than 4% in terms of GDP, and a negative D-L curve floated between -10% and -20% of GDP (see Figure 7.3). This

implies the coexistence of excessive lending in the financial sector and a mostly balanced aggregate demand and supply. This is not say that the macroeconomic conditions worked smoothly. On the one hand, excessive credit from the financial system facilitated aggregate investment well, as seen in the steady S-I gap. On the other hand, as observed in Figure 7.4, overall economic stability was shaky, as observed by the several “stop–go” cycles in that period, as well as serious inflation following those cycles.

From the supply side, SOBs were the driving force behind the extravagant credit expansion, as their primary role at that time was as the cashier of the government. From the demand side, although SOBs may have shown interest in more efficient use of funds, the majority of credit still flowed to the SOEs, according to arrangements with the state. The incentive to earn profits and the enforced policy lending thus raised the problem of soft budget constraints for the SOBs. This can be seen in the two waves of credit boom, from 1984 to 1986 and again in the early 1990s. From the productive efficiency view of finance, the explosion of credit supply, with a growth rate of more than 30% on an annual basis between 1984 and 1986, stimulated aggregate demand; this was because funds were granted to both efficient and inefficient investment projects when compared with previous years. The result was that real GDP growth rate was pushed as high as 18% in 1986, which stimulated growth in savings deposits in the following years, which was then followed by another cycle with a longer delay (see Figure 6.14).

From the aspect of allocative efficiency, the economic development driven by these credit booms resulted in crucial resources being misallocated, as both good and bad investment projects received credit from the financial system. Furthermore, government-led credit expansion meant that it was not possible to properly allocate

financial resources, even during the years when credit supply slowed. When overheating occurred in the economy after a massive credit expansion, government-led monetary tightening would follow. The state thus adopted tough credit plans for the SOBs on a bank-by-bank basis. During cool-down periods, not only were inefficient investment projects rationed out to the capital market, but so were low risk–high return projects. In other words, an insufficient credit supply combined with credit rationing caused additional allocative inefficiency.

A period of credit expansion, followed by a period of contraction, and then once again expansion laid the foundation for the "stop–go" cycles of China's economic development in the 1980s and early 1990s. During this period, the financial sector's function to create credit was emphasized. Through expansionary credit provision by the SOBs, effective demand was generated; the fact that gross savings and investment were nearly equal implies that the financial sector was successful in creating savings through investment. This fits with the main argument of productive efficiency from the Keynesian–Schumpeterian view of finance. However, it also came with certain costs, such as unstable growth, high inflation, and the efficiency loss in investment. From the mainstream view of finance, it suggests that if China's financial system at that time could have allocated resources in a more efficient way, even greater economic achievement would have occurred. Another cost of this credit expansion was the accumulation of nonperforming loans (NPLs). Although the financial sector showed a shift to use more market-conforming elements, the problem of historical NPLs burdened the SOBs continued development. The NPLs were mainly generated during the two credit booms in the mid-1980s and early 1990s. It was not until the late 1990s, when these NPLs were gradually written-off to asset management companies that the SOBs began to show vitality again (see Table 3.7).

As argued in this section, for the pre-1995 period, the financial sector was heavily restricted from pursuing a more profit-oriented development path, which would set allocative efficiency for prior consideration. When such restrictive conditions were removed starting in 1994, the mechanism the financial sector used to interact with the real sector development changed.

7.5.2 Post-1995

From 1995 and onward, overall economic development in China has been steadier. The "stop–go" cycles mostly disappeared, and inflation moderately controlled. Contrary to stable economic growth, however, what was observed from the circulation of monetary was a widening S–I gap, which means excessive gross savings over total investment. A similar gap can be observed between aggregate savings deposits and loans in the financial system.

As pointed out, financial sector reform, as well as other reform events that took place around 1994, is responsible for the dramatic changes in both S-I and D-L balances, and hence the evolution of economic development. First, recommercialization of the SOBs occurred because fiscal and SOE reforms created feasible preconditions. In order to coordinate with the pace of SOE reforms, state credit plans were abolished after 1998. During the recommercialization process of the SOBs, the lending behavior of the financial system, especially of the SOBs, shifted to be more profit-oriented. However, the SOBs only began to outperform the banking sector average, in both financial

conditions and other aspects,[25] ten years later, starting in 2004 and 2005. It is argued that this is due to the burden of the historical NPLs, which were mainly produced in the pre-1995 period. When the shareholding and public listing reforms of the four SOBs was completed in late 2000s, and as those historical NPLs were written-off, it became difficult to distinguish the SOBs from the other large commercial, and even foreign, banks. They were all publicly listed companies, with boards at their centers, competing with other banks on the market, and suffering from even tougher state regulations based on the latest version of the Basel Banking Supervision Accords.

Second, the slowing down of credit provision from the financial sector after 1994, reflected in the widening S–I gap, was not only caused by SOBs' pursuing of profit-oriented targets; the new regulatory framework also played a vital role in that process. Article 39 of the Commercial Banking Law, promulgated in 1995, was an important regulatory instrument. The "Loan to Deposit ratio" was introduced as a substitution method to lending ceilings. According to this article, the total outstanding loans to total deposits shall not exceed 75%. Given the serious problems of inflation and NPLs caused by excessive credit expansion prior to 1995, the reason for the adoption of this article was because the financial sector changed roles and the state moved from a quantitative development path to a more qualitative one. In other words, through Article 39, the state required that banks, especially the SOBs, shift their developmental strategy to a qualitative growth of credit provision. Given the extra attention paid by the regulatory body to SOBs starting in 1994, as seen in Figure 7.5, the loan to deposit ratio of the SOBs decreased at an even faster pace than the average of the financial sector.

Third, the adoption of a more prudential strategy concerned about quality lending led to

[25] See Chapter 5, section 5.3.

more efficient allocation of resources. As previously argued, allocative inefficiency, caused by a period of excessive credit expansion followed by a period of excessive credit contraction, was the fundamental reason for the "stop-go" feature of China's economic development pre-1995. Therefore, a steady GDP annual growth, with an average rate of around 10%, as well as moderate inflation that wavered between 0% and 5% on an annual basis, indicated improved allocative efficiency. A gentle credit growth rate post-1995 and an improved investment efficiency from 1998 to 2007 (see Figure 5.12 and Figure 5.13) further confirm the gain in allocative efficiency. By pursuing allocative efficiency, the financial sector spurred real sector development in the post-1995 period; this finding fitted mainstream view on the finance–growth nexus. By correlating market imperfections, that is, easing transaction costs and informational asymmetry costs, resources were allocated for most efficient use, such as high return–low risk projects. Given the ongoing commercialization and marketization reforms, the SOBs and SOEs also pursued allocative efficiency.

However, the improvement in allocative efficiency, which was largely achieved through more prudential lending strategies, came with costs of macro imbalance. Such imbalance is reflected in the imbalance between gross savings and investment, or the imbalance between aggregate effective demand and supply. Recall that in Figure 7.7 the S-I balance during the pre-1995 period suggested an efficient monetary circulation, given that gross savings and investment fluctuated around 0%. The post-1995 period thus indicates a less efficient monetary flow. From the Keynesian–Schumpeterian view of monetary circulation, where investment creates savings, more savings and comparatively less investment and hence enlarging S-I gap can be also understood as a circumstance of insufficient effective domestic demand. On the one hand, to overcome demand insufficiency, during the post-1995 period China began to push an export-led

growth strategy; on the other hand, a shifting from domestic to foreign consumption further weaken domestic investment-savings creation cycle through credit creation.

Given the uncertainties in international trade, such as changing terms of trade, exchange rate risks, and so on, the declining share of domestic expenditure in GDP caused by insufficient effective domestic demand and more reliance on foreign demand inevitably produced negative effects on China's economic growth in the mid- to long-term.. As a result, as the engine of China's economic development, the average industrial annual growth rate from 1995 to 2010 was more than 1% lower than between 1978 and 1994, when it was 11.13% and 12.30%, respectively (Figure 7.4).

This is not to say that during the post-1995 period, productive efficiency has not been emphasized. One good example could be the 4-trillion-CNY stimulus package. As a response to the outbreak of the Global Financial Crisis in 2007 and 2008, the central government launched a huge stimulus program amounting to 4 trillion CNY (around 586 billion USD) in late 2008, much of which was de facto channeled through credit creation via the banking system. The resulting massive expansion of domestic bank lending led to an increase of the share of domestic credit to GDP from around 96.63% in 2008 to more than 119% in 2010. At the same time, China's investment rate increased from 41.61% of GDP in 2007 to about 48% in 2010, while the savings rate remained above 50% of GDP throughout, thereby shrinking the current account surplus. Such massive credit booming once again illustrated the productive efficiency of Chinese financial sector in stimulating investment and employment by credit creation, though allocative inefficiency accompanied by at the same time.

7.5.3 Summary

This analysis has shown the interactions between productive efficiency and allocative efficiency in China's financial system throughout the reform periods. Productive efficiency emphasizes the function of credit creation in the financial system, and it draws on the Keynesian–Schumpeterian view of endogenous finance. This efficiency dominated the pre-1995 period, with the effect of efficiency loss in investment and instability in economic growth. Greater attention was paid to allocative efficiency in the post-1995 reform period. The gain in more efficient resource allocation, however, came at the cost of insufficient effective demand.

The relationship between these two types of efficiencies tends to be complementary rather than substitutive, though it can be quite difficult or even impossible to distinguish one from the other during interactions between the financial system and economic development. However, by emphasizing the relative importance of one efficiency over the other during different development periods, the economic outcome was largely different, as seen in the analysis of both the pre- and post-1995 periods. In the next section, formal economic tests are adopted to examine the two efficiencies and the connection with real sector development.

7.6 Savings and investment, evidence from cross-regional capital mobility, and S-I causality

Fundamentally, the allocative efficiency and productive efficiency views of finance, from the two theoretical traditions, hold different perspectives on the causal direction between savings and investment. The neoclassical school insists that savings determine

investment; scholars from the Keynesian–Schumpeterian school advocate the reverse.

In accordance with the above analysis, it is clear that China's overall economic reforms since 1978 showed different efficiency attributes during the pre- and post-1995 periods. Therefore, a direct test of the causal nexus between savings and investment during these periods can be adopted to verify this analysis and the relative fitness between the two theoretical frameworks in relation to China.

However, before the application of the causality test between gross savings and investment, the consequences of cross-regional integration between savings and investment in China must be considered. The changing level of regional capital integration over the past three decades illustrates the evolving efficiency in cross-regional capital facilitation from the aspect of capital mobility and allocative efficiency.

On the one hand, for the pre-1995 period, the function of credit creation was emphasized in financial practices. The mechanism for coordinating nationwide savings and investment—cross-regional capital movement— occurred through excessive credit provision in particular regions. This was due to the quasi fiscal role the financial system assumed via the state. From 1987 to the late 1990s, less developed central and western provinces recorded much higher shares of total new bank loans as compared to their share of total deposits, while the reverse occurred in the more developed coastal regions (Brandt & Zhu, 2007, p. 99). During the pre-1995 period, although financial resources were not allocated fully by market principles by means of a cost-return rate, the mechanism of financial resources redistribution—channeling savings to facilitate investment across regions—was guaranteed through state-administered credit provision.

On the other hand, for the financial reforms post-1995, when the quasi fiscal role of the SOBs was largely abolished through the establishment of specialized development banks and the fiscal system was recentralized, market-determined lending practices implied a change in the mechanism for national savings–investment coordination, from formerly administrated cross-regional credit provisions to a domestic capital market. With the development of a formal national capital market, profit seeking played an important role in the cross-regional capital flows after 1995, given the change in lending behaviors of the banks. There was better capital mobility as the capital market became more efficient. Although the mechanism behind the savings–investment transformation changed over time, this better mobility of capital was jointly affected by the two efficiencies during different phases of financial reform.

Argued by Watanabe (2006, p. 70), this switch in mechanisms created further efficiency loss, as it took time to carry out new reforms that were largely dependent on the development degree of the market economy as a whole; such as with the corporate sector's pace of reforms. For example, the speed of the reforms that took place in 1994 varied: the abolishment of administrative control of SOBs' lending practices occurred immediately, while the establishment and maturity of a national capital market took time. It was not until January 1996 that an interbank market was set up by the central bank, and it took another five months for the liberalization of interbank interest rates. To accommodate the SOEs' reform pace, the state's credit plan was not officially abolished until 1998.

Accordingly, the positive effects generated by the development of capital markets and the negative influence from the SOBs no longer playing the role of fiscal agency both

affected the integration of capital flows across regions. The most likely situation was an *n*-shaped capital mobility over the reforming periods, caused by the lags between the step-by-step, time-consuming market-oriented reforms and the change in function of the SOBs.

In order to estimate the coordination between savings and investment across regions in China, a "savings retention coefficient" (SRC) was adopted, based on the seminal work of Feldstein and Horioka (1980, p. 317). In their pioneer paper, Feldstein and Horioka made a simple regression between gross savings and investment for 16 OECD economies between 1960 and 1974, with the rationality that if capital mobility is perfect in a world with perfect competitive markets and no market frictions, capital will always move to the regions with the highest returns across economies. Therefore, a higher international capital mobility can be observed by a relatively small or close to zero S-I coefficient in regression, which they named SRC.

Surprisingly, Feldstein and Horioka were unable to find a low or insignificant SRC in their study, leading to the famous "Feldstein-Horioka puzzle". Their hypnosis on capital mobility can be extended to studies on the integration of capital flows in one particular economy. Furthermore, with the application of regional or provincial-level data within one economy, problems such as currency conversion, currency devaluation, and the targeting of current accounts by the government can be excluded (Boyreau-Debray & Wei, 2004, p. 10; 2005). The empirical literature on the study of capital mobility in economies with a highly integrated capital market has documented either negative or insignificant correlations between regional savings and investment. This provided substantial evidence to verify the original hypothesis from Feldstein and Horioka

(1980).[26]

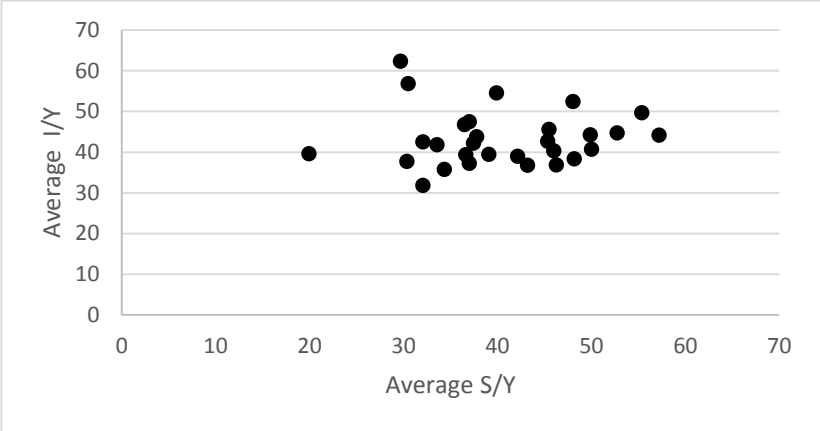
7.6.1. Data description and the basic model

Given the dominant role of the banking system in channeling financial resources in China, this section examines cross-provincial savings and investment data, and the cross-provincial deposits and loans relationship.

All the data are collected from the official sources. The provincial-level GDP figures, capital formation, and expenditures are via the China Statistical Database (National Bureau of Statistics of China, 2013). Provincial deposits and loans data are from Statistical Yearbooks from each province. There is the issue of a lack of data availability, as explained earlier in this thesis. As there are no consistent disaggregated expenditure-based GDP data for Hainan and Tibet before the 1990s, only 27 provinces and 4 municipalities of China's total 29 provinces and 4 municipalities are used in the data sample, and the year range is from 1980 to 2010. In these tests, investment, I/Y, is defined as the rate of gross capital formation over expenditure-based GDP (see Boyreau-Debray & Wei, 2004, 2005; Li, 2010). Savings, S/Y, is derived from the difference between expenditure-based GDP and total consumption, which includes private consumption and government expenditure over GDP. Year-end stock of deposits are denoted by D/Y, and L/Y denotes outstanding loans at the provincial level. A cross-sectional look of the data is in Figures 7.8 and 7.9 and Table 7.2.

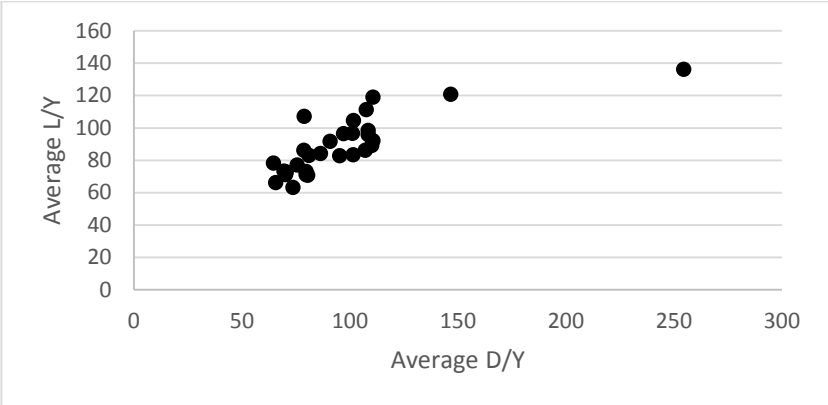
[26] See Sinn (1992) for the United States; Dekle (1996) for Japan; Bayoumi and Rose (1993) for the United Kingdom; and Helliwell and McKitrick (1999) for Canada.

Figure 7.8 Cross-provincial S and I, 29 regions, 1980–2010 average, in terms of GDP, %



Source: Author's calculations.

Figure 7.9 Cross-provincial D and L, 29 regions, 1980–2010 average, in terms of GDP, %



Source: Author's calculations.

Table 7.2 Cross-provincial savings, investment, deposits and loans, 1980–2010 average, in terms of GDP, %

Province	Investment	Savings	Deposits	Loans
Beijing	52.43	48.03	254.50	136.30
Tianjin	49.68	55.33	110.56	119.14
Hebei	40.74	50.00	73.55	63.30
Shanxi	45.61	45.47	110.63	92.19
Inner Mongolia	46.84	36.47	64.49	78.38
Liaoning	38.42	48.17	97.04	96.44
Jilin	43.81	37.78	78.81	107.26
Heilongjiang	36.88	46.24	80.98	83.06
Shanghai	44.19	57.18	146.61	120.76
Jiangsu	44.78	52.73	79.58	71.21
Zhejiang	40.34	45.97	95.21	82.84
Anhui	37.28	36.99	70.50	72.83
Fujian	39.50	39.07	80.34	70.92
Jiangxi	39.40	36.60	75.51	77.21
Shandong	44.31	49.86	70.10	71.30
Henan	42.72	45.32	69.39	73.44
Hubei	38.99	42.14	78.64	86.21
Hunan	31.86	32.06	65.62	66.31
Guangdong	36.84	43.17	110.09	89.29
Guangxi	37.73	30.34	79.69	73.14
Chongqing	42.27	37.43	90.73	91.82
Sichuan	35.78	34.34	101.15	96.74
Guizhou	39.68	19.92	86.34	84.32
Yunnan	41.84	33.55	101.50	83.55
Shaanxi	47.49	36.97	108.34	98.42
Gansu	42.57	32.05	108.39	95.91
Qinghai	56.89	30.46	101.52	104.73
Ningxia	62.38	29.65	107.47	111.33
Xinjiang	54.56	39.88	107.11	86.25

Note: Author's calculations. China Statistical Database (2013). Provincial Statistical Yearbooks (various issues).

According to Feldstein and Horioka (1980), the basic model to capture capital mobility is:

$$\overline{I/Y_i} = \alpha + \beta * \overline{S/Y_i} + \varepsilon_i \quad \text{(Eq. 7.2)}$$

where

$$\overline{I/Y_i} = T^{-1}\sum_{t=1}^{T} I/Y_{it},\ \overline{S/Y_i} = T^{-1}\sum_{t=1}^{T} S/Y_{it}, \quad (i \text{ denotes province}) \text{ (Eq. 7.3)}$$

However, given the dramatic economic evolution of China over the last 30 years, a

mathematical averaged investment or savings rate may not necessarily capture time-specific effects. To deal with that, one possible method is to divide the entire sample period into several parts and then compare the relative change of SRC in different time phases (see Boyreau-Debray & Wei, 2004, 2005; Watanabe, 2006). Another possible method is to apply a panel dataset so as to contain both regional and sectional attributes (see Chan et al., 2011; Li, 2010).

Compared with a pure cross-section or time-series data, a panel dataset that pools cross section and time series together provides several benefits. First, the main advantage of introducing a panel technique is to make it possible to explore the dynamics changes of the target variables in short periods. Second, panel data can increase the quantity of observers. Third, a panel dataset can effectively control for unobserved sectional-specific effects that are classified as the error terms in models with the cross-section data. To summarize, by applying a panel dataset, the combination of a cross section and time series can improve both the quantity and quality of data.

As discussed in the previous section, the logic and mechanisms behind the cross-provincial capital movement in China is distinctively different in the pre- and post-1995 periods, based on the relative dominance of the allocative or productive efficiency. Accordingly, this thesis's sample was broken into two groups: 1980 to 1994 and 1995 to 2010. The panel technique was then applied in both sub-datasets.

Therefore, the original model from Feldstein and Horioka (1980) can be rewritten as follow

$$I/Y_{it} = \lambda_{1i} + \beta_1 * S/Y_{it} + \varepsilon_{1it} \qquad \text{(Eq. 7.4)}$$

where i stands for province, t stands for time, and the regional-specific effect is

captured by λ_i.

Similarly, there is:

$$L/Y_{it} = \lambda_{2i} + \beta_2 * D/Y_{it} + \varepsilon_{2it} \quad \text{(Eq. 7.5)}$$

Before applying the dataset into the regressions, it was necessary to apply a unit root process into each variable to examine the stationary of the variables. There are many unit root tests for panel datasets, which hold different assumptions (see Breitung, 2000; Chang, 2004; Im, Pesaran, & Shin, 2003; Levin, Lin, & Chu, 2002; Maddala & Wu, 1999). But as argued by Chan et al. (2011, p. 1508), the provinces in China not only suffered from common policy shocks but also from several regional specific shocks. These include the "opening door" policies in the coastal provinces at the start of the reforms, and the "develop-the-west" strategy from the central government in the 2000s. The analysis for this thesis uses the method in Im, Pesaran, and Shin (2003) and the test in Hadri (2000) because these relax the assumption of cross-section independence in unit root processes. All the tests contain time trends and a demeaned process, which subtract the cross-sectional averages from the series. As argued by Levin, Lin, and Chu (2002), such demeaned process could reduce the impact from cross section dependence. Unit root test results are in Table 7.3.

By testing each individual unit root within an ADF-style model, the null hypothesis of the Im–Pesaran–Shin test is that all panels contain unit roots. In contrast, the null hypothesis for the Hadri test is the stationarity of all panels. As seen in Table 7.3, both tests suggest the existence of unit roots for the four variables in the two sub-samples, which is in line with the result from Li (2010, p. 17). Boyreau-Debray and Wei (2004, 2005), who used a similar Im–Pesaran–Shin root process, suggested that both provincial

investment and savings rates were stationary between 1978 and 2001.

Table 7.3 Im-Pesaran-Shin / Hadri unit root tests, 1980–2010

		Im-Pesaran-Shin test				Hadri test
		lag1	lag2	lag3	lag4	
1980-1994	I/Y	-0.862	0.805	0.802	-1.844**	9.995***
		(0.194)	(0.790)	(0.789)	(0.033)	(0.000)
	S/Y	-0.143	0.360	-0.192	0.578	9.554***
		(0.443)	(0.640)	(0.424)	(0.719)	(0.000)
	L/Y	0.436	-0.713	-0.207	1.134	12.821***
		(0.669)	(0.238)	(0.418)	(0.872)	(0.000)
	D/Y	0.498	0.425	0.937	2.482	7.8005***
		(0.691)	0.664	(0.826)	(0.994)	(0.000)
1995-2010	I/Y	0.890	1.454	-0.120	0.666	17.685***
		(0.813)	(0.927)	(0.452)	(0.747)	(0.000)
	S/Y	2.004	0.0373	0.588	-1.507*	17.461***
		(0.978)	(0.515)	(0.722)	(0.066)	(0.000)
	L/Y	-1.404*	-0.585	-0.670	-2.199	16.514***
		(0.080)	(0.279)	(0.252)	(0.014)**	(0.000)
	D/Y	-0.097	1.251	-0.228	1.670	16.368***
		(0.463)	(0.895)	(0.410)	(0.953)	(0.000)
1980-2010	I/Y	1.453	2.271	1.716	1.524	35.741***
		(0.927)	(0.988)	(0.957)	(0.936)	(0.000)
	S/Y	-0.413	-1.350*	-0.1435	0.262	33.365***
		(0.340)	(0.089)	(0.443)	(0.603)	(0.000)
	L/Y	3.544	2.952	2.398	2.276	47.834***
		(1.000)	(0.998)	(0.992)	(0.989)	(0.000)
	D/Y	2.823	2.894	2.230	1.965	40.513***
		(0.998)	(0.998)	(0.987)	(0.975)	(0.000)

Source: Author's calculation. *P*-values in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01. The statistics obtained from Im, Pesaran, and Shin denote normalized *t*-statistics; results from Hadri test denote LM statistics. I = investment; S = savings; L = loans; D = deposits; Y = GDP.

Following the unit root process, the cointegration relationship between S-I and D-L was tested, concerning the possibility of spurious regressions suggested by Granger and Newbold (1974). Generally, there are no common consensus on the panel data cointegration test, as this area remains quite new. The analysis in this thesis adopted the eight tests from Pedroni (1999, 2004) and Kao (1999), who each based a two-step Engle-Granger cointegration process with the null hypothesis of no cointegration

between variables; the results are presented in Table 7.4. The three ADF tests (two from Pedroni and one from Kao) rejected the null hypothesis at 1% level, and suggested the existence of a cointegration relationship between savings and investment between deposits and loans in the two periods (1980–1994 and 1995–2010), except for the panel ADF test for deposits and loans between 1980 and 1994. The results for the rest tests vary. But for each column, which contains two variables in one time span, at least three out of the eight tests indicate cointegration between variables.

Table 7.4 Pedroni and Kao panel cointegration test, 1980–1994 and 1995–2010

	S/Y–I/Y (Eq. 7.4)		D/Y–L/Y (Eq. 7.5)	
	1980-1994	1995-2010	1980-1994	1995-2010
Pedroni tests				
Panel (within-dimension)				
Variance ratio statistic	-1.801	-1.253	1.899**	3.730***
	(0.964)	(0.105)	(0.029)	(0.000)
Phillips-Perron Rho statistic	0.847	2.402	3.178	1.412
	(0.802)	(0.992)	(0.999)	(0.921)
Phillips-Perron *t*-statistic	-2.068**	0.665	2.800	-1.125
	(0.019)	(0.747)	(0.997)	(0.130)
ADF *t*-statistic	-3.523***	-5.615***	-0.386	-3.378***
	(0.000)	(0.000)	(0.350)	(0.000)
Group (between-dimension)				
Phillips-Perron Rho statistic	2.767	3.022	4.609	3.160
	(0.997)	(0.999)	(1.000)	(0.999)
Phillips-Perron *t*-statistic	-1.974**	-0.783	3.983	-1.743**
	(0.024)	(0.217)	(1.000)	(0.041)
ADF *t*-statistic	-3.805***	-5.830***	-2.166**	-4.479***
	(0.000)	(0.000)	(0.015)	(0.000)
Kao test				
ADF *t*-statistic	-3.447***	-2.826***	-3.065***	-4.022***
	(0.000)	(0.002)	(0.001)	(0.000)

Source: Author's calculations. *P*-values in parentheses. All Pedroni tests contain time trends.
I = investment; S = savings; L = loans; D = deposits; Y = GDP.

7.6.2 Results from panel estimation

After a unit root and cointegration process, which suggested the existence of a long-run relationship between savings and investment, and deposits and loans, regressions were applied into the analysis. The estimation results of Equation 7.4 ad Equation 7.5 are shown in Tables 7.5 through 7.8. Given that the primary objective of this estimation is to compare the value of the coefficient, that is, β in different time periods, a variety of commonly used panel data estimators were jointly applied, including pooled ordinary least squares (OLS) estimator, fixed effects, random effects, first-difference GMM and system GMM estimators.

Table 7.5 Cross-provincial savings-investment estimation, 1980–1994 and 1995–2010

	Pooled OLS		Fixed effects		Random effects		First-difference GMM		System GMM	
	1980-1994	1995-2010	1980-1994	1995-2010	1980-1994	1995-2010	1980-1994	1995-2010	1980-1994	1995-2010
β_1	0.171***	0.313***	0.431***	1.184***	0.375***	1.059***	0.402***	0.347***	0.301***	0.142***
	(3.51)	(5.70)	(7.42)	(21.25)	(7.06)	(19.07)	(6.65)	(6.96)	(6.16)	(3.85)
N	435	464	435	464	435	464	377	406	406	435

Note: t statistics in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01.

Table 7.6 Cross-provincial deposits-loans estimation, 1980–1994 and 1995–2010

	Pooled OLS		Fixed effects		Random effect		First-difference GMM		System GMM	
	1980-1994	1995-2010	1980-1994	1995-2010	1980-1994	1995-2010	1980-1994	1995-2010	1980-1994	1995-2010
β_2	0.443***	0.419***	0.862***	0.354***	0.795***	0.372***	0.363***	0.0972***	0.269***	0.0970***
	(9.59)	(23.19)	(23.29)	(14.00)	(22.16)	(16.55)	(10.18)	(5.61)	(8.69)	(7.23)
N	435	464	435	464	435	464	377	406	406	435

Note: t statistics in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01.

Table 7.7 Hausman test and Sargan test for savings–investment

Chi-squared	Fixed effects and random effects		First-difference GMM		System GMM	
	1980-1994	1995-2010	1980-1994	1995-2010	1980-1994	1995-2010
Huasman test	5.65	778.86				
	(0.017)	(0.000)				
Sargan test			230.077	260.302	321.635	287.753
			(0.000)	(0.000)	(0.000)	(0.000)

Note: P-values in parentheses. The null hypothesis for Hausman test is that there is no systematical difference in coefficients between fixed effects and random effects models. The null hypothesis for the Sargan test is that over-identifying restrictions are valid. The estimations are made through Stata11.

Table 7.8 Hausman test and Sargan test for deposits-loans

Chi-squared	Fixed effects and random effects		First-difference GMM		System GMM	
	1980-1994	1995-2010	1980-1994	1995-2010	1980-1994	1995-2010
Huasman test	53.86	2.35				
	(0.000)	(0.125)				
Sargan test			397.204	368.104	475.947	515.167
			(0.000)	(0.000)	(0.000)	(0.000)

Note: P-values in parentheses. The null hypothesis for Hausman test is that there is no systematical difference in coefficients between fixed effects and random effects models. The null hypothesis for the Sargan test is that over-identifying restrictions are valid. The estimations are made through Stata11.

First, Table 7.5, includes estimations for two periods via different methods, which recorded a positive and significant correlation between cross-provincial savings and investment at the 1% level. Second, except for the estimations from first-difference and system GMM, by comparing the results between 1980–1994 and 1995–2010, what is found is the β_1: the SRC shows a substantial increase over the two periods, from 0.171 to 0.313, by pooled OLS model; from 0.431 to 1.184 by fixed effects; and from 0.375 to 1.059 by random effects model. According to the original assumption, an enlarged SRC

suggests weakened capital integration across the provinces.

Third, in contrast to what is observed in the S-I correlation, the estimations on cross-provincial deposits and loans document a different picture (see Table 7.6). For the periods 1980–1994 and 1995–2010, the coefficient β_2 declined according to all five estimators. Despite the quite small differences obtained by pooled OLS, the other four panel estimators recorded a more than 50% decrease of the coefficient β_2, which implies a more integrated loans–deposits flow across China over these years.

To test the efficiency of the different panel techniques applied, the Hausman test is used to identify the relative fitness between fixed and random effects models, and the Sargan test is used to test the effectiveness of instrument variables used in GMM models. The results of the Hausman test in Table 7.7 and Table 7.8 suggest the fixed effects models for estimations at the 5% level, except for the deposits–loans regression in the period 1995-2010. Meanwhile, the outcome from the Sargan test suggests a weakness in applying GMM methods in the models; when a lagged dependent variable is used as an instrument variable, the null hypothesis that the instrument variable is exogenous is rejected.

Linking the empirical results obtained in the analysis of the S-I and D-L balance, the following interpretations were found. First, an increasing value of the coefficient β_1 between the pre- and post-1995 periods indicate decreased capital mobility across regions in China. It implies that in a comparison with the post-1995 period, the pre-1995 period's coordination between aggregate supply and effective demand across regions tended to be smoother, given the relative dominance of the productive efficiency of the system. In other words, the mechanism of cross-region resources

allocation in pre-1995 China was more effective than during the post-1995 period, though the efficiency remains unclear. Second, a decreasing β_2 between the two periods suggests that deposit-taking financial institutions, that is, the banking sector, achieved more effective integration of financial resources during the reforms, which can be seen as an outcome of market-oriented financial sector reform during the post-1995 period. Put simply, the regression results confirmed the analysis that the pre-1995 period can be characterized as a period with a more effective aggregate supply-demand match but with less efficiency in resource allocation. Similarly, reverse attributes can be illustrated from the post-1995 period as well.

7.6.3 Evolution of the SRC

In order to provide a detailed look at the evolution of the SRC during the sample periods, cross-sectional analyses were applied for each yearly sub-panel. To control for the effect of a changing macroeconomic climate, provincial-level annual real GDP growth rate (g) was used as the control variable, so that for every year there is: $I/Y_i = \alpha_1 + \beta_1 * S/Y_i + \beta_2 * g + \varepsilon_i$. The changing value of β_1 is reported in Figure 7.9.

It is obvious from Figure 7.9 that at the beginning of the reforms, the correlation between provincial-level investment and savings tended to be relatively weak, where the SRC wavered between -0.2 and 0.2 until the mid-1980s. The SRC then increased, reaching its peak at nearly 0.7 in 1994; this implies the deterioration of cross-regional capital integration during that period. After 1994, the SRC declined sharply and investment was negatively correlated to savings after 2000. After 2006, however, the SRC began to recover, and in 2009 a positive SRC value was once again recorded.

Figure 7.9 Evolution of cross-provincial SRC in China, 1980–2010

Source: Author's calculation.

Turing back to the aspect of efficiency attributes of the Chinese financial system during the different reform phases, the *n*-shaped movement of the SRC across the years is largely in line with this thesis's analysis: the savings-investment nexus is a joint effect by emphasizing the productive efficiency or the allocative efficiency in either the pre- or post-1995 periods. As a matter of fact, 1994 recorded the highest SRC over the 30-year period, meaning the lowest degree of cross-provincial capital movement. This was not only the year that the quasi fiscal redistribution role of the financial system began to be de-emphasized by the central government, but it was also the year when a wave of market-oriented financial reforms occurred.

The development of modern and efficient capital markets obviously generated positive effects on smoother and more efficient capital flows across the regions. However, the entire process took quite a long time because of the financial sector's gradual commercialization, marketization, and internationalization reforms. For the pre-1994 period, when the development of the financial sector and capital markets was at its primary stage, cross-provincial resources allocation was largely guaranteed administratively, mainly in the form of direct or policy-oriented (and excessive) credit

provision from the SOBs.

Accordingly, the movement of the SRC over the reform periods can be understood as the interaction between the relative paces of the following two processes: the defiscalization process and the development of a modern, sophisticated financial system. In Figure 7.9, the SRC's upward trend during the pre-1995 period implies a faster pace of abolishing the old, quasi fiscal mechanisms of resource allocation, in comparison to the pace of constructing new, market-oriented, allocative vehicles. This is the case even though excessive credit provision remained dominant. After 1994, the financial system was largely freed from its quasi fiscal agency role; the declining SRC suggests new capital-channeling mechanisms through a more efficient nationwide capital market.

Linking with the results obtained from the panel estimation in Table 7.5 (the deterioration of cross-provincial savings-investment coordination in both the pre- and post-1995 periods), the state plan and administrative intervention on bank lending in the early stages of reform helped maintain a high level of financial integration. But it also came with huge costs, such as instability in the macroeconomic environment and low investment efficiency. Furthermore, the transition to a new financing mechanism—from the old policy-oriented mechanism to a market-determined one—brought periodic costs, such as the lowered capital mobility illustrated above. It should be noted that these reforms eventually led to long-term development.

In addition, the study's estimations suggest a more integrated loans–deposits relationship from the pre-1995 to the post-1995 period. Deposits-taking financial institutions, more specifically the banking system, achieved substantial improvement in coordinating loans and deposits across the regions, which is largely due to the adoption

of market-oriented lending standards. During this process, allocative efficiency was gained, as banking credit was not restricted for local purposes, but used to seek and identify strong investment projects nationwide.

7.6.4 Error-correction model-based estimation and the Granger causality

The previous section adopted the panel technique to explore cross-provincial capital coordination in China by estimating the S-I and D-L relationship in both the pre- and post-1995 periods. However, as the results from the panel unit root tests suggest (see Table7.3), the non-stationarity of all four variables, the linear regression model may only reflect part of the picture because it neglects short-run dynamics. In this section, an Error-correction model (ECM) framework, adopted to the panel dataset, is discussed. This framework was applied so as to determine the potential differences for the S-I relationship, both in short-run and long-run.

There is no common consensus on testing Granger causality in a panel dataset,[27] and the prerequisite for applying the Granger causality test is the stationarity of variables. One approach (based on cointegration relationships between variables) is to construct a pair of ECMs that have different dependent variables, that is, one that places investment on the left side in equation A, and one that places savings on the left side in equation B. By comparing the relative size and significance of the error-correction term in the pair of models, a relative causal relationship can be examined. In Granger (1988, p. 199), if two series are co-integrated in order 1, that is, I(1), there should be causation between the two series in at least one direction.

[27] The most recent development of panel Granger causality was achieved in Dumitrescu and Hurlin (2012).

Consequently, according to the two-step method introduced by Engle and Granger (1987), to figure out the error-correction terms, the following two equations that estimate the long-run equilibrium S-I relationship are adopted:

$$I/Y_{it} = \beta_{31} + \beta_{32} * S/Y_{it} + \varepsilon_{3it} \qquad \text{(Eq. 7.6)}$$

$$S/Y_{it} = \beta_{41} + \beta_{42} * I/Y_{it} + \varepsilon_{4it} \qquad \text{(Eq. 7.7)}$$

The residuals, ε_{3it} and ε_{4it} are employed into the ECMs as error correction terms (ECTs):[28]

$$\Delta I/Y_{it} = \beta_{51} + \sum_{j=1}^{p} \beta_{52} \Delta I/Y_{i(t-j)} + \sum_{h=0}^{p} \beta_{53} \Delta S/Y_{i(t-h)} + \beta_{54} * ECT_{5i(t-1)} + \mu_{5it}$$

(Eq. 7.8)

$$\Delta S/Y_{it} = \beta_{61} + \sum_{j=1}^{p} \beta_{62} \Delta S/Y_{i(t-\square)} + \sum_{h=0}^{p} \beta_{63} \Delta I/Y_{i(t-h)} + \beta_{64} * ECT_{6i(t-1)} + \mu_{6it}$$

(Eq. 7.9)

Here, *i* and *t* denote provinces and time; μ stands for the new error terms; and β_{54} and β_{64} are the coefficients of the error correction terms, which represent the potential deviation of short-run dynamics from long-run equilibrium.

As for Equation 7.8, if the ECT is significant and the coefficient β_{54} is non-zero, it suggests that aggregate savings is the Granger cause of aggregate investment in the long-run. This interpretation can be extended to Equation 7.9 as well: if the coefficient of ECT β_{64} is significantly non-zero, a long-run Granger causation would exist from aggregate investment to savings. The coefficients β_{53} and β_{63} show the short-run

[28] The ECTs of both models are estimated via fixed-effects panel estimators.

relationship, where the null hypothesis of Equations 7.8 and 7.9 is: savings/investment, which does not Granger cause investment/savings in the short-run would be rejected if the coefficient β_{53}/β_{63} is significant.

7.6.5. ECM Result

As both variables contain unit root (see Table 7.3), a two-step residual-based panel cointegration tests was applied into Equations 7.6 and 7.7, and most of the eight tests rejected the null hypothesis of no cointegration between variables at the 10% level (see Table 7.9). The existence of long-run cointegrated relationship between I/Y and S/Y indicates the applicability of the ECMs.

Table 7.9 Pedroni and Kao panel cointegration test for savings and investment, 1980–2010

	Savings and investment	
	Equation 3	Equation 4
Pedroni tests		
Panel (within-dimension)		
Variance ratio statistic	1.938	1.499**
	(0.133)	(0.034)
Phillips-Perron Rho statistic	-0.045	0.135*
	(0.194)	(0.083)
Phillips-Perron *t*-statistic	-0.830***	-1.985***
	(0.001)	(0.000)
ADF t-statistic	-1.718***	-3.951***
	(0.000)	(0.000)
Group (between-dimension)		
Phillips-Perron Rho statistic	0.840	-0.023
	(0.780)	(0.491)
Phillips-Perron *t*-statistic	-2.406***	-4.535***
	(0.008)	(0.000)
ADF *t*-statistic	-3.748***	-5.88***
	(0.000)	(0.000)
Kao test		
ADF *t*-statistic	-4.416***	-4.231***
	(0.000)	(0.000)

Source: Author's calculations. *P*-values in parentheses. All Pedroni tests contain time trends.

Table 7.10 shows the estimation results for Equations 7.8 and 7.9. First, the coefficient of ECTs for both models show negative values and become significant at the 1% level, which indicates the efficacy of applying ECMs and the existence of an error correction mechanism. Furthermore, the relative small value of the two ECTs' coefficient, which measures the speed of adjustment, with -0.177 and -0.114 for Equations 7.8 and 7.9, respectively, suggests that the influence of long-run equilibrium on short-term dynamics between savings and investment could be little. Nevertheless, the significant ECTs for both equations indicate a bi-directional causal relationship between savings and investment during the reforming era, which is in line with this thesis's argument that both productive and allocative efficiency of the financial system have contributed to overall resource allocations across regions in China.

Table 7.10 Estimation for Savings-investment by Error-correction model, 1980–2010

	Equation 7.8	Equation 7.9
Dependent variable	$\Delta I/Y_{it}$	$\Delta S/Y_{it}$
	Coefficient	Coefficient
Intercept	0.007***	0.005***
	(0.000)	(0.000)
$ECT_{i(t-1)}$	-0.177***	-0.114***
	(0.000)	(0.000)
$\Delta I/Y_{it}$		0.162***
		(0.000)
$\Delta S/Y_{it}$	0.415***	
	(0.000)	
$\Delta I/Y_{i(t-1)}$	0.141***	-0.012
	(0.000)	(0.557)
$\Delta S/Y_{i(t-1)}$	-0.025	0.113***
	(0.626)	(0.001)

Source: Author's calculations. *t* statistics in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01. Both equation are estimated by fixed effects panel estimators. Lag 1 is selected according to the estimated results of models with different lagged terms.

Second, for Equation 7.8, with a coefficient of 0.415, $\Delta S/Y_{it}$ show a positive correlation with the dependent variable $\Delta I/Y_{it}$ at the 1% level. That is to say, in the short-run, savings also can be seen as the Granger cause of investment. The positive and significant coefficient recorded from $\Delta I/Y_{i(t-1)}$ suggests that investment in a previous period affects investment in the current period, with an elasticity of 0.141. The insignificance of $\Delta S/Y_{i(t-1)}$, however, implies that the influence of savings in the previous period on current investment is limited. For Equation 7.9, which sets savings in the first-difference form as a dependent variable, the 1% significance of both $\Delta I/Y_{it}$ and $\Delta S/Y_{i(t-1)}$, with an elasticity of 0.162 and 0.113, respectively, suggests a Granger causation from investment to savings is short-run. Similar to the results obtained from Equation 7.8, the insignificance of $\Delta I/Y_{i(t-1)}$ shows that the change in savings is only affected by the current change of rate of investment and by savings in the previous period.

Overall, the ECM-based estimation shows the bi-directional causality between savings and investment, in both short-run dynamics and long-run equilibrium. Whether savings cause investment or investment causes savings, has been laid for the foundation of how the different mechanisms in China's financial system and financial development effect for economic development, as advocated by the mainstream finance-growth school and the Keynesian-Schumpeterian view of banking and finance. The bi-directional causality from this thesis's estimation suggests that both productive efficiency and allocative efficiency played roles in the context of China's reforms over the past 30 years. These empirical results support the interpretation that the two mechanisms are complementary, rather than substitutive, and the relative dominance of one over the other changes with time.

7.7 Conclusion

This chapter began with an analysis of the theoretical differences between the mainstream view and the Keynesian-Schumpeterian view of the interaction between savings and investment from a micro practice scope, by means of stylized T-account banking practices.

When this analytical framework is put into context, it was found that financial reform over the last 30 years in China can be clearly distinguished into two periods: pre-1995 and post-1995. In the former period, productive efficiency dominated the path of reform, while in the latter period, allocative efficiency was emphasized. Although it is impossible to discretely distinguish these two efficiencies during China's financial reforms, their relationship is complementary to each other, rather than a strict substitution, given that their attributes focus on the same thing but from different logical beginnings.

According to this thesis's analysis, a productive efficiency, emphasizing the function of credit creation and drawing on the Keynesian-Schumpeterian view of endogenous finance, dominated China's financial reforms in the pre-1995 period. It was pointed out that there were costs in efficiency loss in investment and instability in delivering growth during this period. In the post-1995 reform era, it was shown that allocative efficiency dominated, and that while there were gains in more efficient resource allocation, the cost was insufficient effective demand. This interactive relationship between the two efficiencies is confirmed by the *n*-shaped SRC curve throughout China's entire reform period.

In the empirical discussion, the panel technique was used to regress the coefficients between cross-provincial savings and investment in China. Additionally, the panel ECM model was used to explore the long-term relationship between these variables in provincial-level data, and a two-way causal direction between savings and investment was identified. This proves that both types of efficiencies played roles in these reforms.

Chapter 8

Financial development and economic development in China

8.1 Introduction

In the previous chapters, financial development in China was assessed from the perspective of monetization (or financial deepening and broadening), from the perspective of financial liberalization and at the nexus of investment and savings. By introducing the Keynesian-Schumpeterian view of endogenous credit supply, this thesis argued that the development of China's financial sector spurred economic development, not only through improvement in efficiency in resource allocation. What is more important is that financial development had a dynamic impact on economic development by supporting aggregate investment through an expansion of credit provision. Previous chapters focused on the evolving development of the financial system itself, and this chapter emphasizes the linkage between finance and economic development through econometric tests.

8.2 Capital accumulation as the engine of economic development

In the standard Solow model, investment is assumed to have only level effects, not growth effects. Based on the typical neoclassical assumption that savings can smoothly transfer into investment provided there are no market frictions, the role of a financial system is largely ignored. The financial repression thesis introduced by McKinnon (1973) and Shaw (1973) first pointed out the importance of financial development on

the determination of savings and investment. In their views, investment is key for economic development, and insufficient investment caused by "financial repression" constrains low-income countries from high-speed growth. By using logarithms and differentiating according to time yields under the framework of Solow's model, which in heart is the Cobb-Douglas production function, the output growth rate can be interpreted by the growth of capital stock, labor, and technological progress (see Equation 8.1). The technological progress here, however, is treated as exogenously determined, so that an increase in investment may have limited effects on technological and productivity change. In other words, long-term economic growth is largely determined by exogenous factors: the growth in total factor productivity (TFP) and natural population growth.

$$g_y = a_L * g_L + a_K * g_K + g_A\ (TFP\ growth) \quad \text{and } a_k + a_L = 1 \quad \text{(Eq. 8.1)}$$

where *Y* is output, *K* and *L* represent capital and labor, *A*, known as Solow residual, denotes TFP. Constant return on scales is assumed as $a_k + a_L = 1$.

By relaxing the assumption of diminishing returns on capital stocks but emphasizing increasing or constant return on scales, the mainstream endogenous growth theory argued that the determinant of economic growth is the "positive function of the investment ratio" (Fry, 1995, p. 69). Pagano (1993) offered a simple growth determination model based on an AK production function. Output growth can be interrupted as:

$$\mathrm{g} = A\emptyset\mathrm{s} - \delta \quad \text{and} \quad \emptyset\mathrm{s} = \emptyset\frac{S}{Y} = \emptyset\frac{I}{Y} \quad \text{(Eq. 8.2)}$$

where *A* is the technology growth, *s* denotes savings rate, $\emptyset$ denotes the proportion of investment transferred into savings due to financial frictions, and δ is the depreciation rate. A more detailed version of this equation is in Chapter 2.

In Equation 8.2, aggregate investment is assumed to be a function of gross savings. It is clear that an increase in savings or an investment rate affects long-term growth rate. The efficiency of financial intermediation, measured by $\emptyset$, may also be crucial for long-term growth determination.

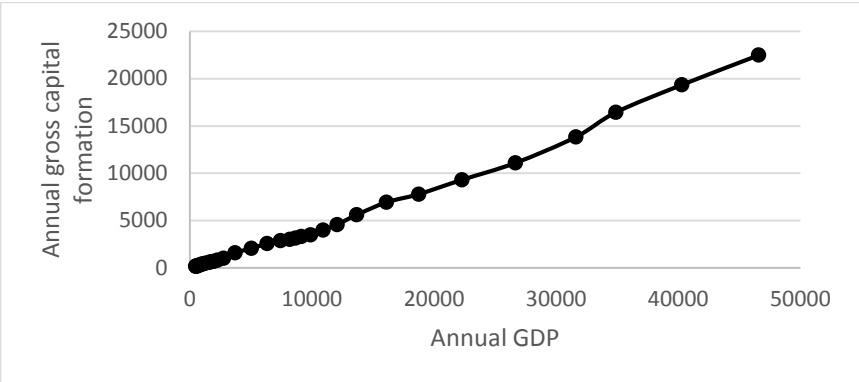
The role of capital accumulation, or investment, has been heavily emphasized in the neoclassical growth theory, as well as in other theoretical traditions. Alternative theories, however, have emphasized the interactive relationship between investment and technological progress. In the Kaldorian tradition, with the assumption of increasing returns to scale, it is assumed that technological progress is endogenously determined and embodied in capital accumulation.[29] Technological change is inclusively reflected by the amount of investment, or the capital stock accumulated between two periods. As with the New Cambridge School's criticism of the concept of capital in neoclassical aggregate production function, Scott (1989) argued that investment and the Solow residual—technological change—are different parts of the same thing. Scott held that technological change and productivity growth cannot be measured separately from investment because investment is required for technological development, and investment itself involves technological change. In both the Keynesian-Schumpeterian credit creation framework and the post-Keynesian's theory of endogenous credit (finance) (Dullien, 2009; Herr, 2010), a similar view is held: it is the willing investment by entrepreneurs that begins the business cycle, and accumulated capital from

[29] For a detailed Kaldor-Verdoorn model, see Wulwick (1993, p. 331).

investment that spurs economic development.

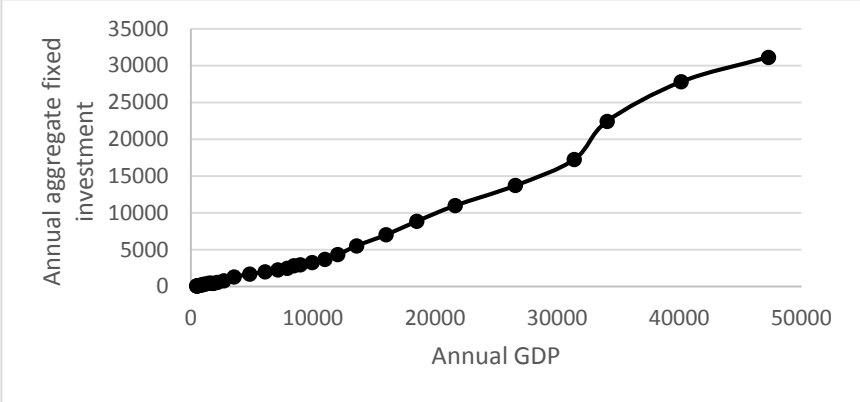
In the case of China, which has taken an investment-driven, capital-deepening development path (Lo & Li, 2011, p. 75), there is no doubt that capital accumulation played a vital role in China's "miracle" over the last 30 years. But most studies on growth in China follow the neoclassical production function approach: there is no room for the contribution of investment on technological progress and productivity growth. In nominal terms, the scatter plots of GDP and gross investment measured in two different ways all indicate a strong and positive relationship between investment and economic development in China (see Figure 8.1 and Figure 8.2).

Figure 8.1 Correlation between gross capital formation and GDP in China, 1980–2010, billion CNY



Source: China Statistic Yearbook (2012).

Figure 8.2 Correlation between total fixed assets investment and GDP, 1980–2010, billion CNY



Source: China Statistic Yearbook (2012).

An additional check of the role of capital accumulation can be made by simple growth accounting; these results are reported in Table 8.1. With the assumption of constant return to scale, the following equation, as a transformation of the Cobb-Douglas production function, was applied.

$$\ln(Y_t/L_t) = a_{31} + a_k * \ln(K_t/L_t) + g * t + \lambda \quad \text{(Eq. 8.3)}$$

For data processing, series of output (*Y*) and labor (*L*) are taken from the official sources (China Statistic Yearbook, various issues), and *Y* is adjusted to constant 1978 prices. Based on the perpetual inventory method (PIM), in which $K_t = K_{t-1} * (1 - \lambda) + I_t$ where *K* is the net capital stock, *I* is the gross investment, and λ is the depreciation rate, this thesis's analysis uses the series of gross fixed capital formation derived from expenditure-based GDP as the measurement of gross investment. The initial benchmark capital stock in 1978 is estimated as gross fixed capital formation in 1978, divided by 10%, and the series of capital stock is deflated to real 1978 prices[30] (see Zhang 2008)

[30] The implicit deflator for capital in China is available only after 1991. To generate the deflator before 1991, this thesis follows the method from Zhang (2008). For any year, the implicit deflator for fixed capital formation (1978=1) is constructed by

The depreciation rate is set at 4%, given that the official rate of 3.6% could be biased due to explosive capital utilization during the reforming era. Logged value of all the three variables, *Y*, *K*, and *L*, are adopted into the regression model.

Table 8.1 China's standard growth accounting, 1980–2010

	1980-2010
	ln(*Y*/*L*)
ln(*K*/*L*)	0.561***
	(8.469)
Constant	-1.634***
	(-14.536)
Time trend	0.032***
	(5.948)
AR(1)	1.206***
	(7.775)
AR(2)	-0.630***
	(-4.098)
R-squared	0.999
F-statistic	7599.684
Prob. (F-statistic)	0.000
D.W. test	1.825

Source: Author's calculation. *t* statistics in parentheses; * p < 0.1; ** p < 0.05; *** p < 0.01.

The result is reported in Table 8.1. This study's regression confirmed the contribution of capital accumulation in output determination, where the coefficient, a_k, as the elasticity of capital, reported a significant value of 0.561. Furthermore, with the assumption of constant return to scale, the elasticity of labor input, a_L, derived by $a_L = 1 - a_k$, equals 0.439. By estimating the elasticity of capital and labor, the annual growth rate of TFP can be calculated according to the Cobb-Douglas production function.[31] With the assumption of constant return to scale, then $TFP_t = Y_t/(K_t^{a_k} L_t^{1-a_k})$. TFP growth of the

$\frac{Gross\ fixed\ capital\ formation\ at\ year\ t\ (current\ price)}{The\ index\ of\ fixed\ capital\ formation\ at\ year\ t\ (1978=1)}$

$Gross\ fixed\ capital\ formation\ at\ year\ 1978\ (current\ price)$. The index of fixed capital formation is collected from National Bureau of Statistics (1997b).

[31] With the assumption of constant return to scale, the elasticity of capital a_k can be estimated from $\ln(Y_t/L_t) = a_1 + a_k * \ln(K_t/L_t) + g * t + \lambda$, and TFP can be calculated as $TFP_t = Y_t/(K_t^{a_k} L_t^{1-a_k})$.

Chinese economy is reported in Figure 8.3. During the first half of the reform period, from 1980-1994, the Chinese economy had a severe fluctuation in TFP growth. The pre-1995 period recorded a higher average rate of TFP growth, 3.83% annually, which is on average 1% faster than that of the post-1995 period. The latter period recorded an annual average rate of 2.75% of TFP.

Figure 8.3 Total factor productivity growth of China, 1980–2010, %

Source: Author's calculation. China Statistic Yearbook (2012).

8.3 The role of investment efficiency in capital accumulation

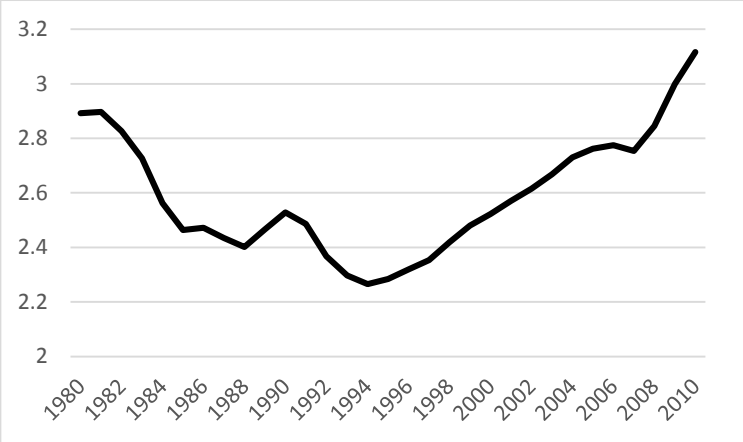
8.3.1 Estimate investment efficiency

Alongside the scale of accumulated capital, reflected by the aggregate investment to GDP ratio, the efficiency involved in capital generation, or more specifically, investment efficiency, can be crucial for overall capital accumulation. The traditional way to evaluate the efficiency of capital generation is to use the "capital-output ratio" (*K*/*Y*), derived from the standard neoclassical production function. By rewriting Equation 8.1, the growth rate of the capital-output ratio can be identified as:

$$g_K - g_Y = \alpha * (g_K - g_L) - g_A \qquad \text{(Eq. 8.4)}$$

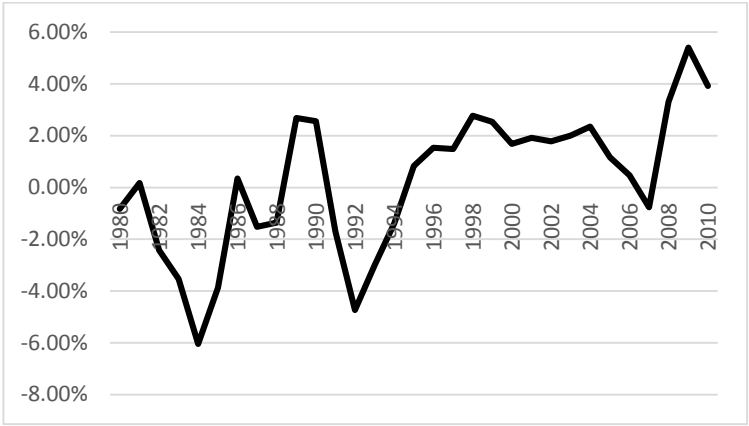
Figure 8.4 and Figure 8.5 shows both *K*/*Y* and its growth rate for the Chinese economy between 1980 and 2010. A *U*-shaped moving tendency of the capital-output ratio was recorded during the reform era. Starting around 2.9 in 1980, the ratio of *K*/*Y* decreased gradually over the next 15 years, reaching its bottom of approximately 2.3 during the mid-1990s. Year 1994 was the turning point; from that point forward, substantial recovery of the *K*/*Y* ratio occurred, reaching a ratio of 3.1 in 2010. At a first glance, as the reciprocal of the productivity of capital, the distinctive different moving tendencies of the *K*/*Y* ratio between pre-1995 and post-1995 periods suggests an enhancement in capital productivity in the first half of the reform period, followed by deterioration in the second half.

Figure 8.4 Capital-output ratio of China, 1978 constant price, 1980–2010



Source: Author's calculations.

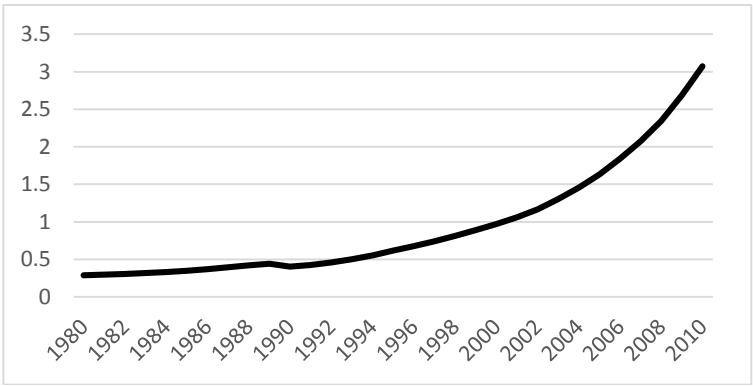
Figure 8.5 Growth rate of capital-output ratio, 1980–2010



Source: Author's calculation.

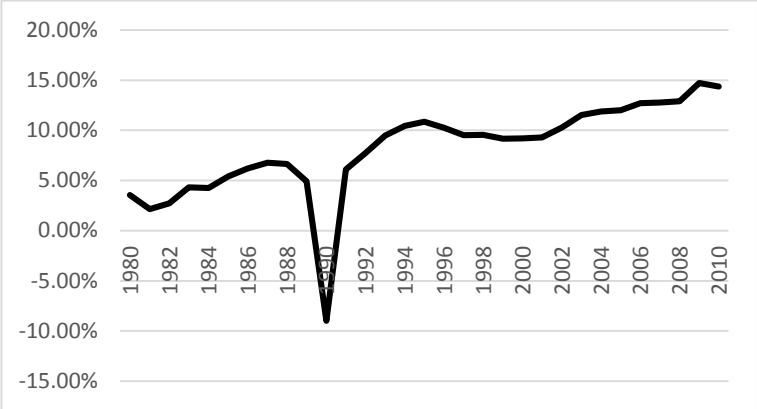
Looking at the right-hand side of Equation 8.4, the change in the *K*/*Y* ratio, shown on the left-hand side, can be interpreted as the combined effects of the change in the capital–labor ratio—$g_K - g_Y$ and g_A—the technological progress, or TFP growth. The change in the *K*/*Y* ratio largely depends upon the relative change in pace between capital intensity (the capital–labor ratio) and TFP growth. A dramatic capital deepening process can be identified during the entire reform period (see Figure 8.6 and Figure 8.7). Using the capital–output ratio as the efficiency indicator of capital formation may be biased and reflect only a partial picture.

Figure 8.6 Capital–labor ratio of China, 1980–2010



Source: Author's calculation.

Figure 8.7 Growth rate of capital–labor ratio (capital intensity), 1980–2010



Source: Author's calculation.

Another commonly used proxy to measure investment efficiency is to assess the marginal terms of the *K*/*Y* ratio: the incremental capital–output ratio (ICOR; see Chapter 5). Equal to the reciprocal of marginal product of capital during two time spots, the meaning of ICOR is easy to understand as a reflection of the amount of capital required to guarantee per-unit output growth. The lower the ICOR, the higher the investment efficiency (productivity of investment). As in Xiong (2010), the use of ICOR as the proxy of investment efficiency can avoid several difficulties; the most crucial is to avoid an estimation of capital stocks. The ICOR in China during the reform era fluctuated up and down, though significant direction is hard to capture (see Figure 5.12).

The relationship between ICOR and the capital–output ratio can be interpreted as the product of ICOR and the output elasticity of capital[32] (Zhang, 2010). Therefore, if a normal change in capital's output elasticity over the years is assumed, ICOR and the capital–output ratio should move in the same direction. By comparing the two curves in Figure 8.4 and Figure 5.12, it is observed that the moving tendency of ICOR and the *K*/*Y* ratio between 1980 and 1995 showed a decreasing trend, and it was only prior to the late 1990s that they tracked each other well. On the one hand, the divergence of the ICOR and *K*/*Y* ratio after the late 1990s indicates that the output elasticity of capital

[32] The output elasticity of capital is equal to the product of dY/dK and K/Y.

changed during the second half of the reform period. On the other hand, it may also suggest that the ICOR was sufficient to indicate proper investment efficiency.

One crucial prerequisite for using the *K*/*Y* ratio and ICOR as the investment efficiency indicators is the steady share of capital and labor in total input. As seen in Figure 8.5, the Chinese economy suffered a dramatic capital deepening process, especially in the post-1995 period. Therefore, if the change in capital–labor ratio is not controlled, both the *K*/*Y* ratio and the ICOR would be insufficient indicators of the productivity of capital yet would indicate the changing share of capital in total input. It is possible that the *K*/*Y* ratio and ICOR, and any marginal change of the *K*/*Y* ratio, contain two pieces of information. One is that the *K*/*Y* ratio and ICOR reflect the efficiency of investment, highlighting efficient resources allocation. The other is that the *K*/*Y* ratio and ICOR reflect a change in capital intensity, indicating a structural change in China's economy during the reform periods. A simple equation-based test of the relationship between TFP and ICOR can be applied to verify whether ICOR is qualified to be an efficiency indicator in the following form:

$$g_{At} = \alpha_{51} + \alpha_{52} * g_{Y(t-1)} + \alpha_{53} * ICOR_t + \lambda \quad \text{(Eq. 8.5)}$$

where g_A is the growth of TFP of China's economy reported in Figure 8.3, $g_{Y(t-1)}$is the growth rate of total output in previous period, and λ the error term.

The rational of Equation 8.5 is straightforward: if the coefficient of ICOR, α_{53}, is significantly negative, a lower ICOR implies more efficient use of each unit of capital. This suggests that the ICOR contains more information about investment efficiency. Conversely, if a significantly positive α_{53} is captured, then the change in ICOR may be the result of a change in capital intensity.

The coefficient of output growth in the previous period, α_{52}, captures induced technological change in economic development, while α_{51} accounts for other unexplained information. The results in Table 8.2 record a significantly negative α_{53}, with a value of -0.006, meaning that the TFP and ICOR are not moving in the same direction. In other words, the ICOR contains more information about investment efficiency, while the affect from a changing capital intensity tends to be limited.

Table 8.2 Estimation results of Equation 8.5

α_{51}	0.0116
	(0.560)
α_{52}	0.389**
	(2.374)
α_{53}	-0.006*
	(-1.922)
R-squared	0.296
F-statistic	5.891
Prob. (F-statistic)	0.007
D.W. test	1.477

Source: Author's calculation. *t* statistics in parentheses; * p < 0.1; ** p < 0.05; *** p < 0.01.

8.3.2 The interaction between investment and investment efficiency

In the standard neoclassical framework, productivity growth is assumed to be exogenously determined. The literature that focuses on China mainly holds the view that the growth in China's economy relies on capital accumulation and that improvement in the TFP is weak.[33] The deduced conclusion from these particular studies is that China cannot sustain its high growth rate. This conclusion is largely based on the assumption of diminishing return to scales of capital: the decreasing marginal productivity of capital will lead to convergence and re-equilibrium of China's growth

[33] For a detailed estimation of TFP, see Blanchard and Giavazzi (2006); Woo (1998); Young (2003). For a more recent accounting, see Li and Liu (2011).

path.

The contradictive empirical results derived from the standard growth accounting framework cannot explain that China has sustained its rapid growth for at least 30 years; yet investment-driven capital accumulation is considered the major factor, not the TFP growth behind such economic achievements (see Lo & Li, 2011, p. 65). The problematic results from the neoclassical framework could be from the weakness of the framework itself, even when the assumption of decreasing returns is relaxed.[34]

Recall that the alternative theoretical tradition emphasizes the endogeneity of investment and accompanied technological progress, which induces the capital deepening process. If improvement in investment efficiency is embodied in the process of technological progress, caused by capital formation, a two-way causal relationship between aggregate investment and investment efficiency can be assumed (Scott, 1989). This can be tested in the following equations:

$$ICOR_t = \alpha_{61} + \alpha_{62} * Gross\ fixed\ investment/GDP_t + \lambda \quad \text{(Eq. 8.6)}$$

$$Gross\ fixed\ investment/GDP_t = \alpha_{71} + \alpha_{72} * ICOR_t + \lambda \quad \text{(Eq. 8.7)}$$

The results are reported in Table 8.3. Statistically, in Equation 8.6, the fixed investment had a significantly positive impact on the determination of the ICOR, at a confidence

[34] By modifying the standard growth equation, as in Equation 8.1, Lo and Li (2011, p. 63) designed the following equation: $dY/Y - dL/L = dA/A + \beta * (dK/K - dL/L) + (\alpha + \beta - 1) * dL/L$. The coefficient $(\alpha + \beta - 1)$ is used to test whether there exists increasing returns during China's growth. The results found that the positive value of $(\alpha + \beta - 1)$ was insignificant, while the TFP growth was insignificant with a negative value. The only positive and significant coefficient observed is β of $(dK/K - dL/L)$, with a value of 1.125, which implies a strong affection of capital on growth determination.

level of 5%. In contrast, the impact of the ICOR on gross investment appears weak. A lower ICOR implies a higher investment efficiency, so this result suggests that an increase in the level of investment would distort investment efficiency.

Table 8.3 Estimation results for Equations 8.6 and 8.7

	Equation 8.6	Equation 8.7
$Gross\ fixed\ investment/GDP_t$	13.859**	
	(2.106)	
$ICOR_t$		0.002
		(0.718)
Constant	-1.801	0.381***
	(-0.792)	(4.641)
AR(1)	0.811***	1.333***
	(4.033)	(7.361)
AR(2)	-0.307	-0.408**
	(-1.440)	(-2.067)
R-squared	0.601	0.893
F-statistic	12.559	69.659
Prob. (F-statistic)	0.000	0.000
D.W. test	1.897	1.717

Source: Author's calculation. *t* statistics in parentheses; * p < 0.1; ** p < 0.05; *** p < 0.01.

These results are partially in line with the empirical results from He (2003, p. 383), who also failed to find a positive long-term relationship between investment expansion and its efficiency for the first 20 years of China's overall reform, from 1981 to 2001. Therefore, two additional deduced interpretations can be drawn. First, if the endogeneity of technological progress is still assumed in the expansion of investment, then an insignificant causation from investment expansion to its efficiency improvement implies that investment, more accurately, capital formation, generates dynamic efficiency in productivity growth through other channels, not investment efficiency. One important possible channel, as pointed out by Lo and Zhang (2011, p. 49), is collective learning. It is worth noting that one feasible condition for generating such dynamic productive efficiency is that economic institutions be oriented for the long-term, not for short-term profit seeking.

Second, the weak connection between gross fixed investment yet overall investment efficiency in China may be the mixed results from other sectors. Xiong (2010) started from the perspective of financial liberalization, as did Gelb (1989).[35] An overall positive relationship between financial development and investment efficiency was hard to find until particular focus was given to different sectors and regions of China. Using a provincial-level panel dataset between 1987 and 2004, Xiong (2010) documented a positive and significant connection between increasing real interest rates and improved investment efficiency in China's service sector. Meanwhile, such a connection in the industrial sector was hard to find. Xiong (2010) also reported a positive interaction between financial deepening and investment efficiency in China's coastal areas, which are better developed, though interaction for the entire sample tended to be insignificant.

8.4 Financial development in resource allocation and investment efficiency

In the neoclassical school, the main growth effect delivered by financial development is improved efficiency in financing investment. This refers to allocating financial resources to high return–low risk investment projects by implementing various financial functions associated with financial intermediaries. Although the test results above show a weak connection between quantity of investment and investment efficiency, it is still

[35] Gelb (1989) suggested causation from real interest rates, to financial deepening, to investment efficiency, and finally to economic growth in developing economies from the perspective of financial liberalization. He used a dataset across 34 developing countries and a timeframe of 1965 to1985. The direct interaction between investment efficiency and economic growth was used by applying first-order approximation (Gelb, 1989, p. 20). The original equation of IOCR calculation, IOCR = growth rate of GDP/Investment rate, can be derived into the following forms: $\Delta \text{growth rate of GDP} = \Delta \text{IOCR} * \underline{\text{Investment rate}} + \Delta \text{Investment rate} * \underline{\text{IOCR}}$, where the underlined variables denote the average value.

reasonable, on the one hand, to assume a potential strong correlation between investment efficiency and the development of a financial sector.

On the other hand, through enhanced productive efficiency,[36] financial sector development could have both growth and development effects on overall economic development. Therefore, this section assesses the relative relationship between financial development and gross investment, and between financial development and the investment efficiency.

8.4.1 Financial development indicators

Although in different schools, the term “financial development” is measured in different way according to different theoretical perspectives, for some of the measurements, there are strict assumptions behind. One representative perspective is the using of the proportion of credit issued to non-SOEs (non-state-owned enterprises) and the share of non-SOBs (non-state-owned banks) in total credit provision as indicators of China’s financial development. The construction of such proxies are based on the assumption that Chinese financial development is the result of efficient non-SOEs and non-SOBs. Without testing the robustness of such an assumption, the adoption of certain financial development indicators may be misleading.

Being aware of the restrictions in applying financial development indicators from different theoretical perspective, the three basic financial development indicators employed here are indicators can be safely applied with no further restrictive

[36] Productive efficiency refers to sufficient, or even excessive, credit provision to the real economy. More importantly, this refers to the induced and embodied productivity growth involved in the investment process.

assumptions. The first two indicators, M2/GDP and outstanding total bank credit/GDP (LOAN/GDP) are standard financial development estimators. The M2/GDP ratio measures financial development from the level of monetization, and the LOAN/GDP ratio is a reflection of the level of involvement of bank credits and the banking sector in the real economy. Both indicators measure the degree of financial deepening. The assumption behind both variables is straightforward: a deeper level of interaction between money and the real economy can only be implemented with the support of a large and powerful financial sector. A larger financial sector is associated with a higher degree of sophistication, as well as better efficiency throughout the entire financial system.

A financial repression index (FRI) is the third indicator of financial development employed in this analysis from the view of neoliberalism (see Figure 4.9). Using the technique of principal component analysis (PCA), the major points according to the financial repression thesis, originated by McKinnon (1973) and Shaw (1973), are used in this thesis's FRI. These include real interest rates, financial intermediation control, and state intervention in bank lending. Although the relationship between financial repression or liberalization and economic growth, especially in the context of China's economy, remains a controversial issue (see Chapter 2), the FRI can measure the levels of marketization, commercialization, and liberalization level in the financial sector.

8.4.2 Results

As discussed above, the quality and the quantity of investment are measured by ICOR and gross fixed investment/GDP. The variable applied here is annual data, between

1980 and 2009, given that the generated FRI is not available for 2010 to the present.[37]

To begin, unit root tests were applied to all five variables (see Table 8.4). In combining the information obtained from the three tests, all five variables are stationary in first-order forms, that is, *I(1)*.

Table 8.4 Unit root tests for ICOR, gross investment/GDP, M2/GDP, LOAN/GDP, and FRI, 1980–2009

Variables	ADF test		PP test	
	t-Statistics	Form (C,T,P)	Adj. *t*-Statistics	Form (C,T)
ICOR	-1.375 (0.580)	C,0,1	-1.200 (0.661)	C,0
ΔICOR	-3.184*** (0.003)	0,0,1	-2.573** (0.012)	0,0
Gross fixed investment/GDP	-3.414* (0.07)	C,T,1	-1.513 (0.802)	C,T
Δ Gross fixed investment/GDP	-3.671*** (0.001)	0,0,1	-2.684*** (0.009)	0,0
M2/GDP	-2.567 (0.297)	C,T,6	-2.881 (0.183)	C,T
ΔM2/GDP	-4.825*** (0.001)	C,0,1	-3.419** (0.019)	C,0
LOAN/GDP	-2.244 (0.445)	C,T,6	-2.269 (0.437)	C,T
ΔLOAN/GDP	-3.306*** (0.002)	0,0,1	-2.781*** (0.007)	0,0
FRI	-1.551 (0.491)	C,0,5	-2.754* (0.077)	C,0
ΔFRI	-5.059*** (0.000)	0,0,2	-7.586*** (0.000)	0,0

Source: Author's calculation. *P*-values in parentheses; * p < 0.1; ** p < 0.05; *** p < 0.01. C = constant, T = time trend, and P = period of lags. The period of lags in ADF test are selected according to Akaike Info Criterion. The number of observations for each variable is 30.

[37] This due to the change in the reporting format of total loans of all financial institutions reporting to the People's Bank of China and China Banking Regulatory Commission. As for the data in previous years, a series of detailed short-term loans by classification was reported; this was then used in the analysis to estimate the degree of state intervention in allocating bank loans.

In the next step, the potential cointegration of variables was tested based on the following two equations. The results are in Table 8.5.

$$ICOR_t = \alpha + \beta * Financial\ development\ indicator_t + \varepsilon \quad \text{(Eq. 8.8)}$$

$$Gross\ fixed\ investment/GDP_t = \alpha + \beta * Financial\ development\ indicator_t + \varepsilon \quad \text{(Eq. 8.9)}$$

Long-term relationships were captured among the three financial development indicators and two investment indicators (see Table 8.5 and Table 8.6). As a lower ICOR implies higher investment efficiency, the positive correlation coefficient between ICOR and the three financial development indicators suggests a negative affect from monetary expansion and financial liberalization to investment efficiency.

Table 8.5 Engle-Granger two-step cointegration tests for ICOR, gross fixed investment/GDP, M2/GDP, LOAN/GDP and FRI, 1980–2009

Equation 8.8			Equation8.9		
Independent variable	tau-statistic	z-statistic	Independent variable	tau-statistic	z-statistic
M2/GDP	-3.090 (0.121)	-31.146*** (0.000)	M2/GDP	-3.501* (0.057)	-31.315*** (0.000)
LOAN/GDP	-2.314 (0.385)	-18.196** (0.032)	LOAN/GDP	-2.502 (0.303)	-16.666* (0.052)
FRI	-2.737 (0.217)	-28.893*** (0.000)	FRI	-2.558 (0.281)	-20.105** (0.017)

Source: Author's calculation. MacKinnon (1996). *P*-values in parentheses; * p < 0.1; ** p < 0.05; *** p < 0.01.

After analyzing for potential relationships between variables, simple regressions were considered (see Equation 8.8 and 8.9). Given that completing the investment financing process is time consuming, regression results with one-period lagged financial

development indicators are reported in Table 8.7 and Table 8.8.

Table 8.6 Correlation matrix of ICOR, gross fixed investment/GDP, M2/GDP, LOAN/GDP and FRI, 1980–2009

	ICOR	Gross fixed investment/GDP	M2/GDP	LOAN/GDP	FRI
ICOR	1				
Gross fixed investment/GDP	0.521***	1			
	(3.234)				
M2/GDP	0.667***	0.888***	1		
	(4.731)	(10.197)			
LOAN/GDP	0.607***	0.721***	0.909***	1	
	(4.039)	(5.513)	(11.524)		
FRI	-0.568***	-0.610***	-0.832***	-0.855***	1
	(-3.655)	(-4.077)	(-7.937)	(-8.741)	

Source: Author's calculation. *Note: t* statistics in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

First, though, several points must be addressed. One is that, in Equation 8.8, a significantly positive correlation between M2/GDP and ICOR and between LOAN/GDP and ICOR was captured in the current period (in time *t*) regressions at a confidence level of 1%. In addition, FRI recorded a significant negative coefficient at 5%. For the three regressions with lagged independent variables, the connection is weak. Given that the lower the ICOR, the higher the investment efficiency, the positive value of β recorded in the regressions suggests that financial development, measured by both monetary expansion and financial liberalization, had surprisingly negative effects on investment efficiency, as positive effects were expected.

Table 8.7 Estimation results for Equation 8.8

	Financial development indicators (Independent variables)					
	$M2/GDP_t$	$M2/GDP_{t-1}$	$LOAN/GDP_t$	$LOAN/GDP_{t-1}$	FRI_t	FRI_{t-1}
α	-0.985	0.393	-5.764**	1.963	6.253***	1.636
	(-0.743)	(0.395)	(-2.705)	(0.507)	(4.417)	(0.796)
β	3.684***	2.543***	9.376***	1.466	-4.486**	2.928
	(3.249)	(2.809)	(4.372)	(0.370)	(-2.343)	(1.440)
AR(1)	1.125***	1.075***	1.13***	1.207***	1.183***	1.293***
	(5.388)	(4.527)	(5.596)	(4.298)	(4.830)	(5.270)
AR(2)	-0.485**	-0.591**	-0.407**	-0.477*	-0.555**	-0.448*
	(-2.233)	(-2.499)	(-2.095)	(--1.805)	(-2.337)	(-1.835)
R^2	0.756	0.671	0.787	0.611	0.674	0.640
F-statistic	24.846	15.650	29.602	12.060	16.578	13.606
Prob. (F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000
D. W. test	1.771	1.574	1.974	1.433	1.580	1.425

Source: Author's calculation. *t* statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table8.8 Estimation results for Equation 8.9

	Financial development indicators (Independent variables)					
	$M2/GDP_t$	$M2/GDP_{t-1}$	$LOAN/GDP_t$	$LOAN/GDP_{t-1}$	FRI_t	FRI_{t-1}
α	0.218***	0.221***	0.235***	0.253**	0.413***	0.451**
	(12.751)	(10.775)	(3.403)	(2.193)	(2.915)	(2.197)
β	0.110***	0.112***	0.123**	0.138*	-0.004	-0.039
	(7.446)	(5.907)	(2.097)	(1.907)	(-0.094)	(-0.946)
AR(1)	1.147***	1.102***	1.338***	1.411***	1.351***	1.366***
	(6.858)	(5.267)	(7.552)	(6.639)	(6.433)	(6.214)
AR(2)	-0.587***	-0.586**	-0.492**	-0.482**	-0.409*	-0.415*
	(-3.478)	(-2.649)	(-2.484)	(-2.094)	(-1.833)	(-1.844)
R^2	0.929	0.894	0.887	0.880	0.870	0.867
F-statistic	104.577	64.635	62.491	56.209	53.525	49.895
Prob. (F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000
D. W. test	1.653	1.756	1.651	1.689	1.539	1.561

Source: Author's calculation. *t* statistics in parentheses and * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

A second point is that for Equation 8.9, more reliable results were documented with the reference of R^2 and F statistics. All six regressions reported strong and positive relationships between the level of investment and financial development indicators, both in contemporaneous and lagged terms, except for the relationship between FRI and gross fixed investment/GDP. Put simply, the estimation results from Equation 8.9 suggest that monetary expansion, measured by M2/GDP (growth in banking credits) and reflected by LOAN/GDP, played a significant role in China's investment growth over the reform period. At the same time, the effects of financial liberalization policies, denoted by FRI on promoting gross investment, seems limited.

A third point is that by linking the estimation results from Equations 8.8 and 8.9, an interpretation can be made that the development of China's financial system, from the perspective of both monetization and financial liberalization, mainly effected investment expansion, but did not improve efficiency. However, the connection between a larger, more mature, and more sophisticated financial sector and a more efficient allocation of financial resources remains unclear.

8.5 Financial development and economic growth

In the previous three sections, the relationships between capital accumulation and economic growth, investment and investment efficiency, and investment, investment efficiency, and financial development were discussed. In this section, the interaction between financial development and economic development is assessed directly through econometric tests.

8.5.1 Methodology and the regression model

8.5.1.1 The system GMM method

As reviewed in Chapter 2, a Barro-style (Barro, 1991) single equation approach has been widely adopted in the mainstream empirical literature on the finance–growth nexus, including in both cross-country and China-specific studies. The baseline model with financial development indicators (FINANCE) in the growth equation; emphasizing financial development as part of technological progress usually takes the form:

$$\Delta Y = \alpha + \beta * X + \gamma * \text{FINANCE} + \lambda \quad \text{(Eq. 8.10)}$$

where Y is the indicator of economic development, X is the set of traditional long-term growth determinants, and λ is the error terms.

There are two challenges in adopting the empirical framework presented above. The first is the endogeneity of financial development in empirical tests. With the development of the theoretical models from both mainstream's endogenous financial intermediation view of finance and the endogenous credit view from the Keynesian-Schumpeterian school, a bi-directional causation has been emphasized. Assuming a statistical causal direction from finance to growth, such as in Equation 8.10, inevitably causes a certain level of bias in determining the influence of financial development on economic growth. To address the problem of endogeneity, some early cross-country studies adopted an instrumental variable approach. One such commonly used instrument is legal origins, first introduced by La Porta et al. (1998).

With the development of econometric techniques, recent finance-growth studies use a panel dataset applied to the generalized method of moments (GMM) panel estimator to control for the endogeneity of explanatory variables. In Roodman (2009), the GMM estimator was initially designed to adapt panel datasets, which consisted of a few time periods but many individual effects. Arellano and Bond (1991) proposed the first-difference GMM, which consisted of eliminating fixed individual effects in proposed models by taking the first difference of the given equation.

Consider Equation 8.10, with a panel structure that contains only financial development indicators as explanatory variables. Therefore, Equation 8.10 can be rewritten as:

$$Y_{i,t} = \alpha + \beta * Y_{i,t-1} + \gamma * \text{FINANCE}_{i,t} + \mu_i + \nu_t + \lambda_{i,t} \quad \text{(Eq. 8.11)}$$

where *i* and *t* represent time and regions, μ_i and ν_t denote regional and time invariant individual-specific effects, and $\lambda_{i,t}$ (the idiosyncratic component) are error terms.

With the assumption there are no serially correlated error terms and no predetermined initial conditions of the dependent variable $Y_{i,t}$, the following two moment restrictions are proposed (see Arellano and Bond, 1991):

$$\text{E}\left[Y_{i,t-s}\left(\lambda_{i,t} - \lambda_{i,t-1}\right)\right] = 0 \qquad s \geq 2 \text{ and } t = 3, \dots, T \quad \text{(Eq. 8.12)}$$

$$\text{E}\left[FINANCE_{i,t-s}\left(\lambda_{i,t} - \lambda_{i,t-1}\right)\right] = 0 \qquad s \geq 2 \text{ and } t = 3, \dots, T \quad \text{(Eq. 8.13)}$$

By applying these two moment restrictions, the values of both $Y_{i,t}$ and $\text{FINANCE}_{i,t}$ (with lagged two periods or more) are thus correlated with $(Y_{i,t-1} - Y_{i,t-2})$ and $(\text{FINANCE}_{i,t-1} - \text{FINANCE}_{i,t-2})$, respectively, but are not correlated with $(\lambda_{i,t} - \lambda_{i,t-1})$. Therefore, $Y_{i,t}$ and $\text{FINANCE}_{i,t}$ are valid instruments for estimating Equation

8.11 in first differenced form, shown as:

$$Y_{i,t} - Y_{i,t-1} = \beta * \left(Y_{i,t-1} - Y_{i,t-2}\right) + \gamma * \left(\text{FINANCE}_{i,t} - \text{FINANCE}_{i,t-1}\right) + (\nu_t - \nu_{t-1}) + (\lambda_{i,t} - \lambda_{\square,t-1}) \quad \text{(Eq. 8.14)}$$

Through this process, the regional specific effects—that is μ_i, which is omitted in the OLS estimator—are now eliminated in the first-difference GMM estimator, and the endogeneity of the explanatory variable—that is $\text{FINANCE}_{i,t}$—is controlled.

However, as argued by Blundell and Bond (1998), the efficiency of the first difference GMM estimator becomes weak, especially when using lagged values of both dependent and independent variables as instruments in small samples. To address this problem, a System GMM estimator designed to estimate a combination of the first difference and the level equations was introduced and recommended by Blundell and Bond (1998). The System GMM estimator combines moment conditions for the proposed equation in first difference form (see Equation 8.14), with two additional moment conditions for the equation in levels (see Equation 8.11). The two additional moment restrictions are proposed as:

$$\text{E}\left[\left(Y_{i,t-s} - Y_{i,t-s-1}\right)\left(\mu_i + \lambda_{i,t}\right)\right] = 0 \quad \text{s} = 1 \text{ and t} = 3, \dots, \text{T} \quad \textbf{(Eq. 8.15)}$$

$$\text{E}\left[\left(FINANCE_{i,t-s} - FINANCE_{i,t-s-1}\right)\left(\mu_i + \lambda_{i,t}\right)\right] = 0 \quad \text{s} = 1 \text{ and t} = 3, \dots, \text{T} \quad \textbf{(Eq. 8.16)}$$

In applying the System GMM estimator, the difference equation still employs the same instruments as in the first-difference GMM estimator. For the equation in levels, corresponding variables in both lagged and differenced forms are used as instrumental

variables to control for the potential of endogeneity.

It must be highlighted that in using provincial-level annual data to explore China's finance–growth nexus post-1978, the time span is relatively short,[38] and it only provides a maximum of 33 observable periods for each variable between 1978 and 2010. This relatively small panel sample is ideal, however, and fit the original intention of GMM estimators. Therefore, the System GMM estimator was applied to study the relationship between financial development and economic growth in China. Based on both Equations 8.10 and 8.11, the regression model can be expressed as:

$$Y_{i,t} = \alpha + \beta * Y_{i,t-1} + \gamma * \text{FINANCE}_{i,t} + \delta * X_{i,t} + \mu_i + \nu_t + \lambda_{i,t}$$

(Eq. 8.17)

where *Y* is the growth indicator, *i* and *t* mean provincial and time subscripts. FIINANCE denotes financial development indicators; *X* is a set of traditional growth indicators as control variables; μ and ν are sectional (province) and time fixed effects, respectively; and λ is the error term. To view the level of change of *Y*, Equation 8.17 is rewritten as:

$$\Delta Y_{i,t} = \alpha + (\beta - 1) * Y_{i,t-1} + \gamma * \text{FINANCE}_{i,t} + \delta * X_{i,t} + \mu_i + \nu_t + \lambda_{i,t} \quad \text{(Eq. 8.18)}$$

8.5.1.2 Financial development indicators

The second challenge faced in adopting this thesis's empirical framework is measuring financial development. As argued in previous chapters, financial development indicators

[38] Not all economic indicators are available from the start of the reform period (1978) and onward, given that the national statistic system changed often after 1978. For example, the data for total social fixed investment became available after 1981, while the index of total social fixed investment became available after 1991.

constructed with restrictive assumptions may lead to bias if the robustness of the assumptions is not tested. This is the case for China in adopting financial development indicators designed to simplify the different levels of efficiency according to different institutional ownership. As discussed in Chapter 5, it became harder to distinguish the differences between the four SOBs and the medium and small banks after most of the SOBs and joint-stock commercial banks, and some of the city commercial banks, became publicly listed, and when regulatory standards were imposed by the state mainly based on corresponding versions of the Basel Banking Supervision Accords.

Accordingly, to capture the overall effects of financial development on economic development, China's financial system is treated as a whole, so that the major indicators are constructed on the aggregate level but are not classified by ownership types. The influence of state-ownership in financial development, however, will be assessed through the financial liberalization indicator.

Three groups of financial development indicators are employed in the estimation. The first indicator is Size, which includes the variables: the ratio of outstanding total bank credits over GDP (*credit*), the ratio of total bank deposits over GDP (*deposit*), and ratio of total households' savings deposits over GDP (*household deposits*). As traditional financial development indicators, the loan-to-GDP ratio (*credit*) is used to capture the level of monetization and financial deepening. Inspired by Hao (2006, p. 353), the second *deposits* variable is employed here to capture how well China's financial system is achieving the function of mobilized savings. Self-raising funds have accounted for more than 50% of total fixed investment in most years between 1980 and 2010 (see Table 6.2). Financial development reflected by more efficient mobilization of savings deposits from financial intermediation, as a side channel, could generate positive effects

on promoting economic development. To verify the robustness of the expectations, the variable of *household deposits* is employed because the household sector is usually the driving force behind China's high savings rate. If a larger financial sector implies a higher degree of financial development, then it is assumed that all three variables are positively correlated with economic development.

The second financial development indicator employed is Intermediating, and is designed to capture the impact of changes in lending behaviors in the financial system on economic development. This indicator includes two variables: deposits-to-loans ratio (*DLR*) and the savings-to-investment ratio (*SIR*). By assuming the role of financial intermediation in coordinating both supply and demand sides, *DLR* as a ratio of the source of funds over the use of funds not only contains information about how well financial intermediations mobilize resources, but also how well they allocate them. Furthermore, as argued in Chapter 7, there was an observable change in China's *DLR* from less than 1.0 in the first half of the reform period to above 1.0 in the second half (see Figure 7.5). This may be because of changes in lending behaviors in the financial system: the adoption of more market-oriented lending criteria, or more prudential regulations, or both. The conversation rate—the efficacy of transformation between deposits and loans—thus not only reflects the system's ability to match both supply and demand sides of financial resources, but also reflects the marketization and commercialization levels of the financial system as a whole.

The logic behind the *SIR* is similar to that of the *DLR*, though it takes a macro view of the economic cycle of matching aggregate demand and supply. In other words, the *DLR* and the *SIR* variables are the narrow and broad measurements, respectively, of how well China's financial system coordinates and integrates financial resources between supply

and demand.

The third financial development indicator is Liberalization, which measures the liberalization, marketization, and commercialization of the Chinese financial system. This largely takes the perspective of the financial liberalization theories of McKinnon (1973) and Shaw (1973). The three variables here are the financial repression index (*FRI*) constructed in Chapter 4 (see Figure 4.9) to measure China's financial development from three aspects. The first is the liberalization of interest rates. The second is financial intermediation control, which measures both the statutory reserve requirement ratio of banks and state intervention on bank lending. Third, state intervention is measured by the SOBs' share of total credits provision and the SOEs' share of total issued credit. Using PCA, it was found that the FRI contains nearly 90% of original information. According to the key argument from the financial liberalization theory, the FRI is assumed to be negatively correlated with economic growth.

Following Hao (2006) and Guariglia and Poncet (2008), the other two variables designed for this analysis are the share of bank loans over the state budget in total social fixed investment (loan/budget ratio, or *LBR*) and the share of self-raising funds in total social fixed investment (*SRF*). The *LBR* captures the change in investment intuitions of the real economy of China. In the initial reform stage, the state budget held the majority stake of all external finance sources in facilitating investment assets (see Table 6.2). Therefore, the substitution of bank credits for state budget expenditures can be treated as a proxy for the level of financial sector marketization, because the lending criteria of formal bank credit is more profit oriented when compared to budget expenditures.

For *SRF*, although the impact of firms' capital structure on their performances remains a

controversial issue, generally speaking bank financing is more efficient in capital utilization than self-raising funds due to implicit budget constraints. This argument is supported by Ayyagari et al. (2010), who found that, in Chinese firms, bank financing generates more positive growth effects than other channels. However, it is also argued that informal finance continues to play a vital role in providing financial support, especially to private firms (Allen et al., 2005). This implies Chinese firms continue to face financial constraints. Accordingly, the *SRF* was used to capture the degree financial constraints were eased by financial development.

8.5.1.3 Growth indicator and control variables

For the left-hand-side of the regression-based estimation, the growth rate of real GDP (GG) is considered as the growth indicator. For the right-hand-side of the equation, a one-period lagged real GDP per capita (LGPER) in logarithm terms was introduced to control for convergence. A set of traditional growth determinants was also introduced as control variables. Bond, Hoeffler, and Temple (2001) introduced an instrumental variable based system GMM methodology, to make it possible to consistently estimate parameters in models with endogenous variables on the right-hand side. Thus, four control variables, which are assumed to be weakly exogenous, are now introduced. The first control variable is the total social fixed investment/GDP (*capital*) and the second is the rate of enrollment in higher education per 10,000 people (*education*); these control for physical and human capital input, respectively. The third variable is the density of roads (*infrastructure*), defined as the number of kilometers of road per 100 km2, which is used to capture improvements in infrastructure. The fourth variable is the ratio of foreign direct investment to GDP (*FDI*), which tracks the impact of the levels of openness and world integration in China’s regional economic development.

8.5.2 Data Description

The provincial-level data for growth indicators, control variables, and the first two sets of financial development indicators were adopted. Due to a lack of data availability, for the three variables in the third indicator, Liberalization, only national-level series were collected. This means that these three particular variables will not vary across provinces. Being aware of the potential heterogeneous effects this imposes, further robustness checks were carried out.

All of the data are collected from official sources: China Statistic Yearbook (various issues); Almanac of China's Finance and Banking (various issues); National Bureau of Statistics of China (1997a, 1997b, 1999, 2005, 2009, 2013); and Statistic Yearbooks of individual provinces (various issues). Detailed data source for the created FRI is in Chapter 4.

Due to data limitations, it was necessary to exclude Hainan province and Tibet autonomous region. This dataset thus uses a total of 27 provinces (out of 29) and 4 municipalities in the dataset, and uses a year range of 1980 to 2010. The average data for each province is summarized in Table 8.8.

Table 8.8 Provincial data description, 1980–2010, average

	Growth indicators	Size			Intermediating		Liberalization			Control Variables				
Province	GG	*Credit*	*Deposit*	*Household Deposits*	*DLR*	*SIR*	*FRI*	*LBR*	*SRF*	LGPER	*Capital*	*Education*	*Infrastructure*	*FDI*
	%	%	%	%	%	%		%	%	LN (CNY)	%	Per 10000 population	Km road per 100 KM2 land	%
Beijing	10.62	136.30	254.50	65.52	188.03	97.06	72.45	349.65	67.02	8.30	39.01	194.70	76.37	4.62
Tianjin	11.28	119.14	110.56	47.43	92.05	118.30	72.45	349.65	67.02	8.06	38.87	135.35	56.28	6.47
Hebei	10.95	63.30	73.55	55.97	116.02	124.56	72.45	349.65	67.02	7.14	35.37	46.74	35.45	1.28
Shanxi	10.18	92.19	110.63	60.77	115.42	102.24	72.45	349.65	67.02	7.06	36.08	51.24	33.89	0.63
Inner Mongolia	12.58	78.38	64.49	36.23	84.05	74.75	72.45	349.65	67.02	7.14	37.22	42.51	5.54	2.02
Liaoning	10.15	96.44	97.04	55.15	97.50	133.60	72.45	349.65	67.02	7.63	36.33	73.66	33.89	3.53
Jilin	10.67	107.26	78.81	53.26	74.63	87.59	72.45	349.65	67.02	7.20	36.37	70.23	21.34	2.35
Heilongjiang	8.85	83.06	80.98	50.53	100.89	128.98	72.45	349.65	67.02	7.35	30.13	62.09	13.99	1.80
Shanghai	10.38	120.76	146.61	48.54	114.31	146.05	72.45	349.65	67.02	8.57	36.39	140.56	79.57	5.07
Jiangsu	12.76	71.21	79.58	37.92	107.78	118.81	72.45	349.65	67.02	7.56	33.53	68.02	48.82	4.95
Zhejiang	13.04	82.84	95.21	42.46	110.52	115.74	72.45	349.65	67.02	7.60	33.39	53.68	43.01	2.23
Anhui	10.83	72.83	70.50	37.41	92.13	98.98	72.45	349.65	67.02	6.79	34.57	40.88	40.36	1.19
Fujian	13.11	70.92	80.34	38.49	112.46	97.39	72.45	349.65	67.02	7.32	31.06	50.81	41.20	6.36
Jiangxi	10.20	77.21	75.51	44.77	95.92	91.98	72.45	349.65	67.02	6.80	33.23	55.03	32.36	2.07
Shandong	12.30	71.30	70.10	39.07	97.04	113.15	72.45	349.65	67.02	7.34	33.40	49.63	50.03	2.38
Henan	11.39	73.44	69.39	44.43	92.49	107.79	72.45	349.65	67.02	6.85	31.83	38.72	48.70	0.83
Hubei	10.60	86.21	78.64	39.32	90.31	113.39	72.45	349.65	67.02	7.05	33.24	72.00	41.82	2.47
Hunan	9.89	66.31	65.62	37.58	97.13	102.24	72.45	349.65	67.02	6.90	29.13	48.61	39.21	1.46
Guangdong	13.78	89.29	110.09	57.66	119.62	117.62	72.45	349.65	67.02	7.59	30.46	43.70	52.90	6.28
Guangxi	10.46	73.14	79.69	43.97	106.15	82.12	72.45	349.65	67.02	6.72	30.26	31.72	21.48	1.69
Chongqing	10.74	91.82	90.73	44.98	93.79	90.28	72.45	349.65	67.02	6.87	35.86	53.01	45.55	1.71
Sichuan	10.35	96.74	101.15	51.55	104.37	96.86	72.45	349.65	67.02	6.78	33.80	40.65	21.38	0.92
Guizhou	9.78	84.32	86.34	38.05	98.44	52.59	72.45	349.65	67.02	6.35	34.41	24.51	27.83	0.72
Yunnan	10.15	83.55	101.50	41.96	120.11	82.87	72.45	349.65	67.02	6.72	34.62	27.18	25.70	0.56
Shaanxi	11.06	98.42	108.34	61.10	107.32	76.97	72.45	349.65	67.02	6.86	38.10	79.41	26.97	1.31
Gansu	9.94	95.91	108.39	55.40	113.56	75.12	72.45	349.65	67.02	6.70	35.60	41.85	11.05	0.38
Qinghai	9.58	104.73	101.52	46.97	107.20	54.04	72.45	349.65	67.02	6.99	51.09	30.02	3.40	1.55
Ningxia	10.05	111.33	107.47	56.64	95.56	47.22	72.45	349.65	67.02	6.97	49.05	39.94	16.28	1.39
Xinjiang	10.32	86.25	107.11	50.82	127.94	72.84	72.45	349.65	67.02	7.15	44.15	44.37	3.33	0.25

Source: See text in this section for details.

As observed from Table 8.8, the growth rate of economic development among the provinces between 1980 and 2010 averaged 10.9% per year, with Guangdong province among the top in this sample, with a rate of 13.8%. Heilongjiang recorded the lowest, at 8.9% annually. Roughly speaking, the economic growth rate at the province level did not deviate much, and largely retained convergence. The growth rate of real per capita GDP shows a similar trend, with an average rate of only 1.3% lower than the real GDP growth rate.

In contract to the convergence of economic growth across provinces, the financial variables are observed to have a different outcome. *Credit* varied from 63.3% in Hebei to 136.3% in Beijing. The gap in *deposits* is even wider, from 64.5% in Inner Mongolia to 254.5% in Beijing, which is a nearly quadrupled percentage. Even with *household deposits*, though the variance is narrowed, Beijing, had the highest rate of 65.5%, which is nearly double that of the lowest recorded provinces. For *LDR* and *SIR*, a gap across the provinces is also captured: from a low of 54.2% and 52.6%, and high of156.9% and 146.1%, respectively.

Similar to the financial variables, all four control variables varied across provinces. For *capital*, the gap is more than 20%, from 29.1% in Hunan to 51.1% in Qinghai. What is worth noting is that the three provinces that recorded the highest fixed investment rates are the inner provinces in northwest China: Qinghai, Ningxia, and Xinjiang. This certainly suggests the role the state played in balancing regional income equality through investment, given the Western Development Strategy adopted by the central government in the late 1990s. *Education*, *infrastructure,* and *FDI* show even greater divergence among the regions. There is a difference of nearly 8 times for *education*

across the provinces, and for *infrastructure* and *FDI*, the differences between highest and lowest provinces were 24 times and 26 times, respectively.

8.5.3 Descriptive analysis

To review the relationship between economic development and the financial development indicators, the 29 provinces in the sample were broken into 4 groups according to to their real GDP growth rates, from highest to lowest. Three of these groups, labeled high, upper-middle, and lower-middle, each contain 7 provinces, while the fourth group, labeled low, includes 8 provinces (see Table 8.9). The four control variables and the first two set of financial development indicators (except *FDI*, *LBR*, and *SRF*), classified by GDP, are reported in Figure 8.8 through 8.10.

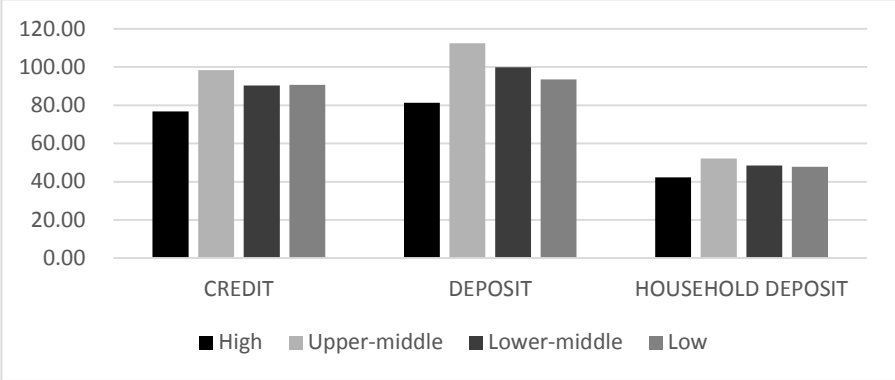
Table 8.9 Regional classification according to GDP growth rate, 1980–2010 average, %

Group	Average GDP	Provinces
High	12.71	Fujian, Guangdong, Henan, Inner Mongolia, Jiangsu, Shandong, Zhejiang
Upper-middle	10.88	Anhui, Beijing, Chongqing, Hebei, Jilin, Shaanxi, Tianjin
Lower-middle	10.36	Guangxi, Hubei, Jiangxi, Shanghai, Shanxi, Sichuan, Xinjiang
Low	9.80	Gansu, Guizhou, Heilongjiang, Hunan, Liaoning, Ningxia, Qinghai, , Yunnan

Source: Author's calculation.

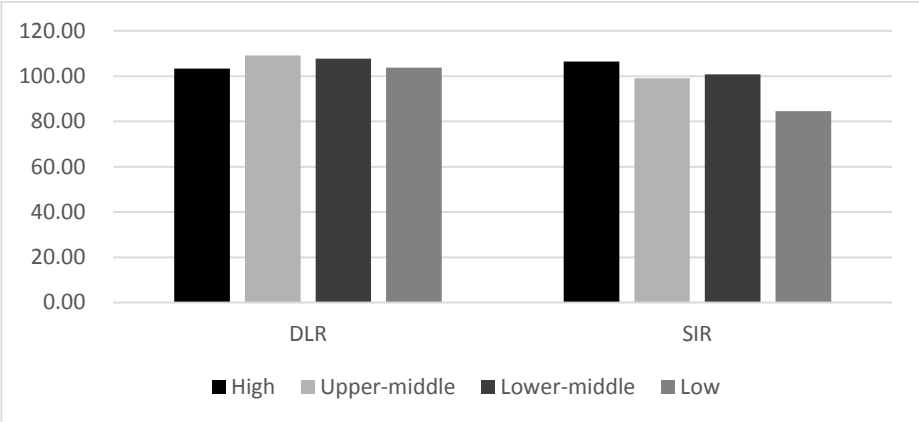
In Figure 8.8, it becomes clear that the provinces with the highest economic growth rate are not associated with the highest level of *credit*, *deposits*, or *household deposits*. However, if the high group is excluded, a positive nexus between financial deepening and economic growth is captured, as all three indicators show a decrease from the groups with higher economic growth rates to the group with lower rates.

Figure 8.8 Size indicators of financial development, classified by GDP growth, 1980–2010 average, %



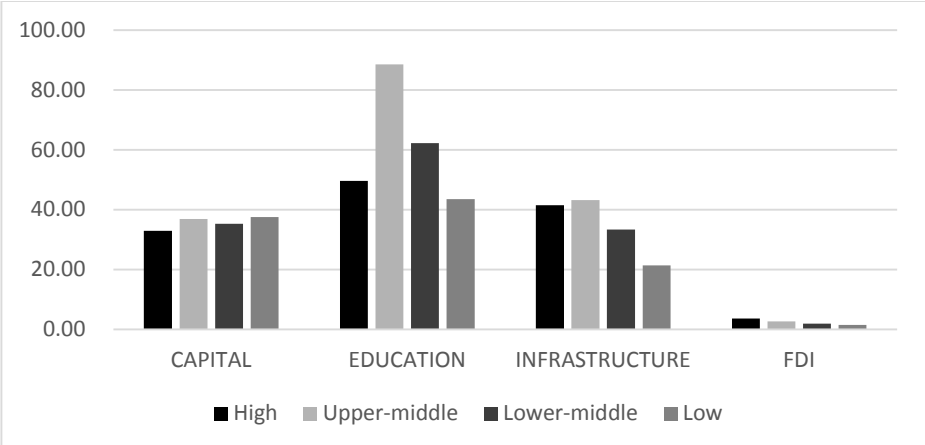
Note: Author's calculations.

Figure 8.9 Intermediating indicators of financial development, classified by GDP growth, 1980–2010 average, %



Source: Author's calculations.

Figure 8.10 Control variables, classified by GDP growth, 1980–2010 average, %



Source: Author's calculations.

There are several observations that need to be highlighted. First, the upper-middle group recorded the highest average *DLR* as compared with the other three groups, though the differences are relatively small. Second, the differences in *SIR* among three of the groups (except the low group) are also small (see Figure 8.9). Generally, the relationship between these two Intermediating variables and economic growth remains quite unclear.

Similar to the situation shown in Figure 8.8, for the most part the provinces with the highest value of the four control variables are not the provinces with the highest growth rate. The exceptions to this observation is for *FDI*. For *education* and *infrastructure*, a positive correlation with economic growth exists in all but the high group (see Figure 8.10). For *capital*, its nexus with economic growth is hard to identify among all groups.

Figures 8.8, 8.9, and 8.10 suggest a roughly positive finance–growth nexus if the high group is excluded from the sample. In reviewing the province composition of the high group, it is found that 5 out of the 7 provinces are in coastal areas, which are usually assumed to be more receptive to the world economy than inland areas. One possibility for this, according to Guariglia and Poncet (2008), may be the substitution of foreign financing over bank financing, especially in provinces receiving a large amount of *FDI*. Supportive evidence in Figure 8.10 shows that the high group enjoys the largest share of *FDI* in terms of GDP terms over all other groups.

The correlation matrix between growth and financial development variables are in Table 8.10. The financial development variables show greater variation than the two growth variables, according to their standard errors. All financial development variables, except

credit and *FRI*, show a positive correlation with growth indicators. Although *credit*'s correlation coefficients with the two growth indicators recorded negative values, the absolute value of the coefficient is relative small. A small correlation coefficient is also obtained between *SIR* and the growth indicators. *FRI* shows a negative relationship with most of the other variables, which is in line with the assumption of a positive financial liberalization–growth nexus.

Table 8.10 Descriptive statistics and correlations between financial development indicators and economics, growth, 1980—2010, %

Descriptive statistic	GG	*Credit*	*Deposits*	*Household Deposits*	*DLR*	*SIR*	*FRI*	*LBR*	*SRF*
Mean	10.88	89.58	96.31	48.27	105.37	96.81	71.50	350.61	66.62
Max.	25.6	225.22	439.63	120.73	256.02	348.76	92.09	754.83	78.29
Min.	-8.4	40.05	24.08	4.32	39.81	7.45	56.16	45.22	55.45
Std. Dev.	3.98	27.47	51.86	24.15	35.7	30.89	11.04	208.88	6.09
Correlations									
GG	1.00								
Credit	-0.06	1.00							
Deposit	0.11	0.76	1.00						
Household Deposit	0.12	0.66	0.78	1.00					
DLR	0.22	0.20	0.75	0.62	1.00				
SIR	0.00	-0.14	-0.08	-0.08	-0.02	1.00			
FRI	-0.15	-0.46	-0.55	-0.75	-0.48	0.06	1.00		
LBR	0.25	0.32	0.25	0.50	0.17	-0.06	-0.40	1.00	
SRF	0.20	0.39	0.61	0.77	0.62	-0.08	-0.64	0.36	1.00

Source: Author’s calculation.

8.5.4 Test results

8.5.4.1 Overall result

The System GMM estimator in Equation 8.17 was adopted individually with each of the eight financial development variables; the results are reported in Table 8.11. Several points can be drawn. First, in Columns 1, 2, and 3, the Size variables record either negative or insignificant coefficients that correlate with the growth indicator GG. This shows that the expansion of the Chinese financial system and its monetization process generated negative effects on economic growth. Such results, especially the negative relationship between banking credit expansion and economic growth, has been observed and confirmed in many pioneer finance-growth studies on China, including those of Boyreau-Debray (2003), Hao (2006), and Ren (2007).

Table 8.11 Finance and growth estimation results, 1980–2010

Dependent variable: GG	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Credit	-0.0267							
	(-1.39)							
Deposits		-0.00421						
		(-0.61)						
Household deposits			-0.0219***					
			(-8.14)					
DLR				0.0644***				
				(-2.83)				
SIR					0.0401**			
					(-2.15)			
FRI						-0.0221***		
						(-5.55)		
LBR							0.0130***	
							(-9.23)	
SRF								-0.206***
								(-12.20)
Lagged real GDP per capita	-0.0137*	-0.0167***	-0.00947***	-0.0509***	-0.0336***	-0.0481***	-0.0466***	-0.0203***
	(-1.75)	(-3.50)	(-2.80)	(-3.09)	(-3.10)	(-9.59)	(-12.18)	(-3.95)
Capital	0.0587***	0.0558***	0.0454***	0.0518***	0.0718***	0.0770***	0.0744***	0.0635***
	(-5.51)	(-6.96)	(-6.32)	(-5.24)	(-7.59)	(-13.14)	(-18.22)	(-9.19)
Education	-0.00192	-0.00282	0.0034	0.00348	0.00927	0.0055	0.0117***	0.0111***
	(-0.14)	(-0.42)	(-1.34)	(-0.21)	(-1.43)	(-1.4)	(-3.58)	(-2.92)
Infrastructure	0.00540*	0.0118***	0.00502	0.0157***	0.00297	0.0190***	0.0180***	0.0184***
	(-1.75)	(-4.66)	(-1.51)	(-3.7)	(-1.08)	(-12.1)	(-6.22)	(-9.09)
FDI	0.00619***	0.00490***	0.00799***	0.00414***	0.00639***	0.00653***	0.00112*	0.00648***
	(-5.21)	(-6.8)	(-8.36)	(-4.25)	(-3.51)	(-5.62)	(-1.69)	(-7.24)
CONSTANT	0.291***	0.309***	0.243***	0.570***	0.478***	0.587***	0.546***	0.299***
	(-4.7)	(-6.95)	(-7.28)	(-4.05)	(-4.33)	(-13.39)	(-15.41)	(-6.25)
Sargan	1	1	1	1	1	1	1	1
AR(2)	0.3129	0.3404	0.3026	0.9054	0.8321	0.6780	0.3456	0.6636
Observations	773	773	773	773	773	744	773	773
Province	29	29	29	29	29	29	29	29

Source: Author's calculation. *t* statistics in parentheses; * p < 0.1; ** p < 0.05; *** p < 0.01. All right-hand-side variables are expressed in Logarithms term. Two-step System GMM estimator are employed in all regressions Being aware of the potential problem of autocorrelation, 2 lags of dependent variable used for all eight regressions, according to the AR(2) test.

Second, in Columns 4 and 5, the coefficients of both the Intermediating variables, *DLR* and *SIR*, are reported with positive and significant numbers, with a confidence level above 5%. As *DLR* and *SIR* are used to capture how well the financial system coordinates the supply and demand of financial resources, this regression result suggests that during all four reform periods, China's financial system successfully integrated resources from both macro- and micro views. Linking the seemingly contradictive results from Size and Intermediating suggests that evaluating the impact of financial development on economic growth through the use of funds, or the source of funds in isolation, tells only a partial story, because the role of the financial system in coordinating supply and demand sides is neglected. At the same time, the strongly positive values of *DLR* and *SIR* captured in the regression are not implicated in a highly efficient financial system, as these two indicators denote the effectiveness of financial system in resources allocation.

Turning to Liberalization, the third financial development indicator, in Columns 6 through 8 of Table 8.11**,** the coefficient of all three of its variables document significant values at 1% confidence level, though the *FRI* and *SRF* each recorded negative numbers, while the *LBR* recorded a positive one. The negative financial repression-growth nexus is in line with the predictions from financial liberalization theory: the liberalization of real interest rates eliminate state intervention in credit allocation, and more formal, market-based financial regulations generate positive effects on economic development. Furthermore, a positive *LBR* suggests that switching from budget-based financing to loan-based bank financing promoted overall economic growth in China. A negative *SRF*, meanwhile, indicates a relatively higher efficacy of other sources of financing, compared with self-raising funds, such as bank loans and *FDI* in growth determination.

For the control variables, a significantly positive *capital* has been observed in all 8 regressions, indicating the contribution of capital accumulation in China's economic progress. *Education*, on the other hand, appears to be insignificant in most regressions. What is worth noting is that a positive *FDI*–growth relationship has also been captured in all 8 regressions, at a significance level of 1%, with the exception of regression 7, which is only significant at 10%. This further emphasizes the role of *FDI* as a growth determinant.

In addition, the Sargan test, which tests the validity of instrument variables, is reported. The null hypothesis of the Sargan test is that instrumental variables are not correlated with residuals. To test autocorrelation, the results of the AR(2) test are reported, with the null hypothesis that errors exhibiting no second order serial correlation. The null hypotheses of Sargan test and AR(2) cannot be rejected in any of the 8 regressions.

8.5.4.2 Sub-period results

Referring to the analysis in Chapter 7, the mechanism of resource allocation in China's financial system changed overtime from a quasi fiscal agency to a more market-oriented one. This mainly occurred in two periods, with 1994 being a turning point, when more fundamental financial and economy reform took place. Accordingly the regression results for these two sub-periods are in Table 8.12, Table 8.13 and Table 8.14.

In comparing the results obtained for the Size indicator during the two periods, Table 8.12 show that the negative effects of monetary expansion of the financial system on economic growth mainly occurred in the pre-1994 period. The negative effects were nearly halved after 1994, given that the coefficients for all three Size variables declined

from -0.137 to -0.0076 (*credit*), -0.0128 to -0.0056 (*deposits*), and -0.0381 to -0.0179 (*household deposits*). Given that excessive credit provision is a major tool of the state and that China's financial system facilitated capital accumulation in the first half of the reform, the negative impact of banking credit on economic growth implies loss of allocative efficiency during credit provision. When market-oriented financial reform occurred, the situation was ameliorated.

Table 8.12 Finance and growth estimation results, 1980–1994 and 1995–2010 (Size indicator)

Dependent variable: GG	1980–1994	1995–2010	1980–1994	1995–2010	1980–1994	1995–2010
	(1)	**(2)**	**(2)**	**(4)**	**(5)**	**(6)**
Credit	-0.137***	-0.0076				
	(-5.52)	(-0.76)				
Deposit			-0.0128	-0.00555		
			(-0.72)	(-0.48)		
Household deposits					-0.0381**	-0.0179***
					(-2.37)	(-3.01)
Lagged real GDP per capita	0.0214	-0.0158***	0.00328	-0.0137***	0.0572	-0.0173***
	(-1.06)	(-3.45)	(-0.18)	(-3.37)	(-1.49)	(-3.52)
Capital	0.162***	0.0149*	0.138***	0.0159***	0.143***	0.0155***
	(-13.41)	(-1.91)	(-10.02)	(-2.78)	(-12.36)	(-3.2)
Education	-0.0598**	0.0177***	-0.0723***	0.0155***	-0.118***	0.0200***
	(-2.23)	(-7.13)	(-3.43)	(-5.29)	(-3.17)	(-8.42)
Infrastructure	-0.0169	-0.00308	0.0306	-0.00163	-0.00307	-0.00333
	(-0.42)	(-1.61)	-1.57	(-0.66)	(-0.07)	(-1.28)
FDI	0.0105***	0.00402**	0.00583***	0.00216	0.0106***	0.00139
	(-6.44)	(-2.28)	(-3.67)	(-1.21)	(-7.64)	(-0.99)
CONSTANT	0.104	0.213***	0.227	0.189***	-0.27	0.208***
	(-0.45)	(-4.23)	(-1.35)	(-4.52)	(-0.72)	(-4.33)
Sargan	1	1	1	1	1	1
AR(2)	0.9168	0.0464	0.9975	0.0777	0.9126	0.0686
Observations	309	464	309	464	309	464
Province	29	29	29	29	29	29

Source: Author's calculations. *t* statistics in parentheses; * p < 0.1; ** p < 0.05; *** p<0.01. All right-hand-side variables are expressed in Logarithms term. Two-step System GMM estimator are employed in all regressions. Being aware of the potential problem of autocorrelation, 2 lags of dependent variable used for all 6 regressions, according to the AR(2) test.

Table 8.13 Finance and growth estimation results, 1980- 1994 and 1995-2010 (Intermediating)

Dependent variable: GG	1980–1994	1995–2010	1980–1994	1995–2010
	(1)	**(2)**	**(3)**	**(4)**
DLR	0.118***	0.000912		
	(-5.1)	(-0.07)		
SIR			0.00515	0.0425***
			(-0.26)	(-3.2)
Lagged real GDP per capita	-0.0595	-0.0265***	-0.0102	-0.0693***
	(-1.58)	(-2.64)	(-0.48)	(-2.94)
Capital	0.132***	0.0224*	0.135***	0.0504***
	(-11.58)	(-1.76)	(-17.55)	(-3.19)
Education	-0.00461	0.0194**	-0.0844***	0.0323**
	(-0.16)	(-2.52)	(-2.61)	(-2.41)
Infrastructure	0.0358	-0.00033	0.0540*	0.00514
	(-0.24)	(-0.13)	(-1.73)	(-1.1)
FDI	0.00138	0.00166	0.00886***	0.00349
	(-0.72)	(-1.27)	(-4.92)	(-1.27)
CONSTANT	0.783	0.296***	0.371**	0.693***
	(-1.52)	(-3.22)	(-2.16)	(-3.34)
Sargan	1	1	1	1
AR(2)	0.4103	0.0532	0.5474	0.4812
Observations	309	464	309	464
Province	29	29	29	29

Source: Author's calculation. *t* statistics in parentheses and * p < 0.1; ** p < 0.05; *** p < 0.01. All right-hand-side variables are expressed in Logarithms term. Two-step System GMM estimator are employed in all regressions. Being aware of the potential problem of autocorrelation, 2 lags of dependent variables used for the first 3 regressions, and 3 lags for the fourth, according to the AR(2) test.

Table 8.14 Finance and growth estimation results, 1980- 1994 and 1995-2010 (Liberalization)

Dependent variable: GG	1980–1994	1995–2010	1980–1994	1995–2010	1980–1994	1995–2010
	(1)	**(2)**	**(2)**	**(4)**	**(5)**	**(6)**
FRI	-0.00016	-0.00954**				
	(-0.01)	(-2.01)				
LBR			-0.00042	0.0185***		
			(-0.06)	(-13.34)		
SRF					-0.343***	-0.00315
					(-13.53)	(-0.10)
Lagged real GDP per capita	-0.00125	-0.0432***	-0.0202	-0.0240***	0.0374***	-0.0369***
	(-0.10)	(-12.25)	(-0.81)	(-7.12)	(-3.05)	(-6.45)
Capital	0.185***	0.00236	0.180***	0.0222***	0.113***	0.0143**
	(-16.94)	(-0.5)	(-13.99)	(-4.96)	(-11.44)	(-2.56)
Education	-0.0979***	0.0320***	-0.0924***	0.0237***	-0.0873***	0.0280***
	(-4.08)	(-14.2)	(-4.85)	(-15.99)	(-4.20)	(-13.39)
Infrastructure	0.0280**	0.0034	0.0794*	0.000956	0.00961	0.00185
	(-2.14)	(-1.44)	(-1.93)	(-0.4)	(-0.76)	(-0.81)
FDI	0.00460***	0.00460***	0.00536***	0.000544	0.00963***	0.00378***
	(-3.22)	(-4.22)	(-4.31)	(-0.51)	(-6.41)	(-3.52)
CONSTANT	0.288**	0.409***	0.507**	0.264***	-0.221**	0.371***
	(-2.35)	(-12.55)	(-2.36)	(-8)	(-2.21)	(-6.14)
Sargan	1	1	1	1	1	1
AR(2)	0.6278	0.1001	0.5318	0.1161	0.8054	0.3187
Observations	309	435	309	464	309	464
Province	29	29	29	29	29	29

Source: Author's calculations. *t* statistics in parentheses; and * p < 0.1; ** p < 0.05; *** p < 0.01. All right-hand-side variables are expressed in Logarithms term. Two-step System GMM estimator are employed in all regression. Being aware of the potential problem of autocorrelation, 2 lags of dependent variable are used for the first 5 regressions, and 3 lags for the sixth one, according to the AR(2) test.

The two Intermediating variables, *DLR* and *SIR*, show consistent results in both periods when they have a positive correlation with economic growth, though the significance varies (see Table 8.13). The banking sector's resource coordination between deposits and loans generates significantly more positive effects in the growth rate in the first period, while significant integration between aggregate demand and supply appear in the post-1994 period.

Interesting results are obtained for the three Liberalization variables (see Table 8.14). The *FRI* has significant negative correlation with the growth indicator, but only in the post-1994 period. Its coefficient for the 1980–1994 period, though, negative, is close to zero, demonstrating that the distortion effects from financial repression were quite limited in the first half of the reform, and became severe over time. Furthermore, the coefficient of *LBR* moved from negative to positive across the two periods, imply that the changing investment vehicle[39] was a continuous process, not a one-off reform event and it takes time to produce positive influence on economic development. Surprisingly, the estimation results for the *SRF* show that the negative effects from financial constraints on economic development mainly occurred in the first half of the reform, as the coefficient for *SRF* became insignificant over time.

For the control variables, according to the results from all 16 regressions in Table 8.12, Table 8.13 and Table 8.14, the insignificant effects of *education* captured in regressions over all phases can be interpreted as a combination of significantly negative effects of human capital on growth in the 1980–1994 period, though positive effects were generated in the second half of the reform. *Infrastructure* remains insignificant in most

[39] This refers to replacing administrative-based financing with more market-based bank financing.

regressions, while *capital* is the reverse. These findings are consistent with the results obtained from full-period regressions. Furthermore, 10 out of the 16 regressions recorded positive and significant *FDI* across the two periods.

8.5.5 Robustness check

Given that using annual data in the regression-based panel estimation can suffer from short-term shocks and business cycles, the results based on averaged data is reported in Table 8.15. All periods contains 31 observations, averaged into six 5-year periods, with the final period being a 6-year period.

Generally, consistent estimation results can be found in the second set of financial development variables: *DLR* and *SIR*. For the three Size variables, the 5-year averaged estimation illustrates more significant but negative effects of monetization and financial deepening on economic growth. Contradictive results, however, are found for the two of three Liberalization variables, as *FRI* and *SRF* are positively correlated with the growth rate of the Chinese economy. This thesis argues that this could largely be due to the lack of observation and variance of the three variables, as only national-level data are employed in this estimation. For this reason, two alternative panel estimators, pooled OLS and fixed effects estimators were used on these three variables to check for robustness (see Table 8.16**)**. As can be seen, for *LBR* and *SRF*, both pooled OLS and fixed effects estimators reported consistent outcomes. This matches the results obtained in Table 8.11.

However, the robustness check illustrated that the *FRI* has either a significantly or insignificantly positive relationship with economic growth, which is in line with the

results from the 5-year averaged system GMM estimation, but in contrast to the annual system GMM estimation results. This means that the role of financial repression on growth determination remains unclear. Given that the variable *FRI* is constructed by PCA, any missing information caused by the PCA method and any potential heterogeneous problems caused by using national-level, rather than province-level, data, could lead to these conflicting results.

Table 8.15 Finance and growth estimation results, 1980–2010, 5-year average

Dependent variable: GG	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Credit	-0.0203***							
	(-4.47)							
Deposits		-0.0432***						
		(-10.11)						
Household deposits			-0.0180***					
			(-6.11)					
DLR				0.0116**				
				(-2.19)				
SIR					0.0124***			
					(-5.62)			
FRI						0.125***		
						(-5.13)		
LBR							0.00265	
							(-0.98)	
SRF								0.255***
								(-5.3)
Lagged real GDP per capita	0.00163	0.00983**	-0.00721***	-0.00563*	0.0036	0.00814*	-0.0163***	-0.0378***
	(-0.25)	(-2.48)	(-2.70)	(-1.75)	(-0.9)	(-1.65)	(-3.45)	(-4.59)
Capital	0.0312***	0.0270***	0.0357***	0.0456***	0.0393***	0.0295***	0.0411***	0.0230***
	(-16.17)	(-8.64)	(-20.28)	(-13.59)	(-14.33)	(-8.9)	(-9.1)	(-6.1)
Education	-0.0000355	0.00941***	0.00313	-0.00662***	-0.00315	0.00881***	0.00142	0.00036
	(-0.01)	(-3.66)	(-1.52)	(-2.75)	(-1.27)	(-3.52)	(-0.38)	(-0.11)
Infrastructure	0.00241	0.000823	0.00708***	0.00958***	0.00267	-0.00131	0.0141***	0.0118***
	(-0.88)	(-0.44)	(-4.25)	(-5.87)	(-1.12)	(-0.31)	(-4.66)	(-2.74)
FDI	0.00468***	0.0111***	0.0103***	0.00410***	0.00274***	0.0123***	0.00491***	0.00734***
	(-4.91)	(-11.88)	(-8.82)	(-3.84)	(-3.07)	(-6.19)	(-3.17)	(-4.25)
CONSTANT	0.154***	0.133***	0.246***	0.228***	0.137***	0.182***	0.297***	0.532***
	(-2.81)	(-3.95)	(-10.83)	(-7.45)	(-3.93)	(-4.44)	(-7.1)	(-6.34)
Sargan	0.7969	0.7808	0.8445	0.6967	0.6391	0.5658	0.2929	0.6459
AR(2)	0.3731	0.2982	0.9276	0.4321	0.3516	0.4451	0.7824	0.1808
Observations	145	145	145	145	145	145	145	145
Province	29	29	29	29	29	29	29	29

Source: Author's calculation. Notes: *t* statistics in parentheses and * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ All right-hand-side variables are expressed in Logarithms term. Two-step System GMM estimator are employed in all regressions. Being aware of the potential problem of autocorrelation, 1 lag of dependent variable are used for the all eight regressions according to the AR(2) test. The dataset is 5-year averaged over 1980–2010 into 6 groups where the sixth group contains 6-year averaged data.

Table 8.15 Alternative panel estimators for Finance and growth, 1980–2010 (Liberalization)

Dependent variable: GG	Pooled OLS	Pooled OLS	Pooled OLS	Fixed effects	Fixed effects	Fixed effects
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
FRI	0.0280**			0.00798		
	(-2.39)			(-0.68)		
LBR		0.00187			0.0182***	
		(-0.62)			(-5.66)	
SRF			-0.0866***			-0.160***
			(-3.36)			(-3.55)
Lagged real GDP per capita	-0.000742	-0.000575	0.00192	-0.0301***	-0.0387***	-0.0125*
	(-0.18)	(-0.15)	-0.51	(-4.34)	(-5.86)	(-1.71)
Capital	0.0450***	0.0437***	0.0512***	0.0545***	0.0542***	0.0520***
	(-8.91)	(-9.45)	(-9.88)	(-7.98)	(-8.78)	(-8.22)
Education	-0.00778**	-0.00879**	-0.00720**	0.00983*	0.0145***	0.00896*
	(-2.15)	(-2.57)	(-2.07)	(-1.89)	(-2.86)	(-1.8)
Infrastructure	0.00751***	0.00757***	0.00783***	0.00844	0.0138**	0.0135**
	(-4.43)	(-4.53)	(-4.84)	(-1.42)	(-2.44)	(-2.31)
FDI	0.00488***	0.00394***	0.00452***	0.00540***	-0.000439	0.00519***
	(-3.98)	(-2.93)	(-3.93)	(-4.43)	(-0.30)	(-4.56)
CONSTANT	0.200***	0.179***	0.142***	0.438***	0.460***	0.245***
	(-5.73)	(-5.24)	(-4.26)	(-7.53)	(-8.41)	(-3.54)
R-squared	0.1782	0.1937	0.2066	0.2142	0.2614	0.2423
Observations	752	778	778	752	778	778
Province	29	29	29	29	29	29

Source: Author's calculation. Note: *t* statistics in parentheses; * p < 0.1; ** p < 0.05; *** p < 0.01. All right-hand-side variables are expressed in Logarithms term. For Column 4 through 6, fixed effects estimator were chosen according to Hausman test.

8.5.6 Summary

To summarize the empirical findings from the system-GMM panel estimator, it was first found that the three traditional financial variables, *credit*, *deposits*, and *household deposits*, negatively correlated to the growth of the economy. This means that expansion of the financial system might negatively affect overall economic development. However, such negative effects decreased over the reform periods, as seen in the relatively smaller coefficients captured in the second half of the reform from sub-sample estimations. This highlights the effects of financial reform during the post-1995 period, which promoted efficiency in allocating resources.

Second, positive *DLR* and *SIR* suggest that the positive effects of financial development on economic growth are largely through coordinating deposits and loans, and savings and investment. From this perspective, China's financial system has done a good job in recourses integration.

Finally, the third set of financial development variables, under Liberalization, shows that the effect of overall financial repression, reflected by *FRI*, is unclear. Furthermore, the substitution of loans from budget expenditures in fixed assets investment generated positive effects on economic growth. The negative correlation between the share of self-raising funds in investment and economic growth suggests that investment funds channeled by financial intermediations are relatively still more efficient.

8.6 Conclusion

In this chapter, empirical tests were applied to verify the connection between financial

development and economic development in China. First, the relationship between investment efficiency and the scale of investment was tested to capture the possible technological progress embodied in the expansion of investment. A significantly negative correlation between the TFP growth rate and ICOR, as well as a weak connection between the ICOR and the rate of investment, suggests that embodied technological progress and induced productivity enhancement during the process of capital accumulation has been limited. Next, the correlation between financial development and the quantity and quality of investment was tested. It was found that the size of the expansion of the financial sector generates negative effects to overall investment efficiency, but positive effects for capital formation.

Finally, by using the System GMM method, a provincial-level panel estimator was adopted to capture the direct correlation between financial development and economic development. It was found that all the Size variables reported negative correlations with economic growth in China. This was linked with the findings earlier in this chapter: there is a negative correlation between the efficiency of investment and the scale expansion of the financial sector. That is to say, through the distortion of investment efficiency (allocative inefficiency), scale expansion of the financial sector had negative effects on economic growth. On the other hand, it was also found that the major positive effects financial development had on economic growth was through coordination of deposits and loans, and savings and investment. This implies there were positive effects of credit expansion on growth through effectively integrating aggregate supply and effective demand. The effects of overall financial repression on growth determination, however, remain unclear. By substituting bank loans for state budget expenditures in all sources of investment funds, a positive connection between less state intervention in the financial sector and greater economic growth can be observed.

Chapter 9

Conclusion

9.1 Contributions of this thesis

In finance–growth studies, China, the second-largest economy in the world, still receives very little attention. Additionally, the literature that does include China largely takes the “simple application” approach in investigating the potential relationship between financial development and economic development, as happened with the theoretical and empirical models developed from mainstream tradition. One crucial problem ignored in these studies is whether any preconditions or presumptions based on market-based economies are met in China’s mixed economy. Without considering the historical features, economic conditions, or other specific facts related to China’s economy, outcomes of such studies cannot be complete. For example, as compared with purely market-based economies, there remains a high degree of state sector involvement in China’s economy.

This thesis argues that without carefully assessing the features embodied in China’s economy and financial sector, a “simple application” approach will inevitably have bias in any understanding of the evolution of China’s financial reforms and the impact on that state’s real sector development.

To overcome these limitations and to capture a comprehensive picture of the features, characteristics, and interactions related to economic development and financial reform in China since 1978, this thesis goes one step beyond: synthesizing competing

theoretical traditions on the finance–growth nexus. By introducing alternative theories, a comparative, analytical framework is constructed that defines China's financial development via different theoretical perspectives, including the Keynesian-Schumpeterian view of endogenous credit creation. The linkage mechanisms between development of China's financial sector and the impact on real sector development is analyzed by examining and verifying the validity and feasibility of the preconditions, assumptions, and channels of how finance affects growth.

The main contribution of this thesis is that it constructs a synthesized framework to assess the historical progress, degree of reform, and impact on economic growth and financial development in post-1978 China. It examines the applicability of several competing theoretical perspectives on the topic of interactive relationships between financial development and economic development.

9.2 Summary of the thesis and major findings

"How can an 'inefficient' financial system, according to purely commercial criteria, successfully support China's economic development?" This was one question raised in Chapter 1. This question, and the others, has been answered throughout this thesis. To now deliver a comprehensive conclusion, the preceding chapters are summarized in order and the major findings are highlighted.

Chapter 2 contains a detailed survey of the theoretical and empirical literature, and lays the foundation and theoretical basis for constructing this thesis's analytical framework. The Keynesian-Schumpeterian view of endogenous credit creation is introduced as an alternative to the mainstream finance-growth theory. A review and summary of the

various theoretical models of financial liberalization and financial development includes endogenous financial intermediations from the endogenous growth models, from the functional view of financial development. Allocative efficiency, according to neoclassical doctrine, and productive efficiency, from the Keynesian-Schumpeterian tradition of endogenous finance, are explained.

Throughout the analysis, it was found that misconnections between theoretical models and empirical studies on the topic of finance-growth nexus has without doubt led to the concept and definition of the term “financial development” to become blurred. In early theoretical models, under neoliberalism, financial development was usually understood to be the same as financial liberalization. The endogenous growth models in the neoclassical tradition emphasize the existence of market frictions, that is informational asymmetry and transaction costs, and recent mainstream theoretical models indicate an improvement in resource allocation efficiency is due to financial development. In addition, in the Keynesian-Schumpeterian tradition, financial development is usually understood as efficiency in generating loanable financial resources, hence improved productive efficiency. However, in the empirical studies, given that efficiency cannot be directly observed, measuring financial development largely takes place through measuring the level of financial deepening. Some efficiency indicators, however, are built on restrictive presumptions that are largely not held in economies that are not purely market-based, like China’s. In empirical studies, financial development is treated the same as financial deepening.

In most of the literature, no matter whether the concentration is on financial deepening, financial liberalization, or improvements in allocative or productive efficiencies, the term “financial development” is universally used. This thesis argues that each of the

competing theoretical perspectives accounts for only one dimension of the story of financial development. Different theoretical perspectives on financial development do share some common settings, but their preconditions and assumptions are far from the same. In order to study the real development of China's financial sector, all dimensions must be considered and examined under a unified framework.

In Chapter 3, the focus is on the evolution of China's financial reforms, which started in 1978. Given the dominance of banks in China's financial sector, the analysis focused only on banking sector reforms. Emphasizing the importance of the principle of gradualism in China's overall economic transition, the reform process is broken into four periods. These periods were created according to the different focus in the reforms. It is found that the financial system transformed from a mono-banking system, and that the overarching goals of the reforms were marketization, commercialization, and internationalization. However, it is also found that through the four periods, the focus of the reforms changed over time. In the first two periods, from 1978 to 1994, although a multi-tiered banking system was constructed, building the capacity of the financial system in facilitating investment was the priority. In the second half of the reform, 1995 to 2010, the focus shifted to resource allocation efficiency through a process of real commercialization. Other features of China's financial reforms are summarized here. First, following the principle of gradualism, each period of concentrated reform was followed by a period of adjustment. Second, the pace of the financial reforms largely depended upon the pace of reforms in the corporate sector, which means that China's financial reforms followed, rather than led, the real sector. Third, it was only in 1994, when corporate sector, especially state-owned enterprises (SOEs), reform speeded up that the process of real commercialization and marketization took place in the financial sector. While SOE reforms largely released state-owned banks (SOBs) to pursue

profit-oriented targets, adopting market-based criteria in lending standards created externalities that induced SOEs to pursue improvements in efficiency and productivity of the financial system.

Structural reforms, institutional arrangement—with state input and on-going changes in the financial system—took more than 30 years to achieve. In the current phase of reform, especially after the IPO of all four SOBs in 2010, focus has shifted to more prudential regulations through the adoption of international rules and standards of the Basel Banking Supervision Accords.

Chapter 2 and Chapter 3 revealed not only the theoretical foundation, but also the necessity to deliver this thesis's analysis under a synthesized framework, remaining aware of the market-supplanting attributes in both China's economy and its financial sector.

In Chapter 4, financial development is assessed via China's monetization and financial liberalization. In the first part of the chapter, two dimensions of monetization are discussed: financial deepening and financial broadening. In the analysis, both the depth of the monetization and the structural expansion of the financial system are taken into consideration. It was found that, first, over the course of the 30 years of reform, banks have always dominated China's financial sector and the financial markets' influence has remained relatively weak. This implies a high degree of financial broadening of the banking sector but a low level for capital markets. Second, although dominance by the four SOBs in the market decreased from almost 100% to nearly 50%, there is still a high level of state dominance in the banking system. Third, financial deepening in China occurred at a high degree and rapid pace, even by international comparison.

Furthermore, this monetary expansion was achieved mainly through the expansion of banking credit. In respect to monetization, China's financial development tended to be high.

In the second half of Chapter 4, the financial system is defined via financial liberalization. First, financial repression is estimated through real interest rates, financial intermediation control, and state influence in bank lending. It is illustrated that financial repression was mixed. The influence of state attributes in lending practices declined gradually, when measured by the share of total credit extended by SOBs to SOEs, while interest rate control and financial intermediation control remained strict. Second, for this thesis, a single financial repression index (FRI), created by using the principle component analysis (PCA), was developed to illustrate the overarching changes of financial repression in post-1978 China. The results show that although rapid and significant financial liberalization occurred, the degree of financial repression remained relatively high, which means that financial liberalization in China is not complete.

To estimate the allocative efficiency of the system, in the first two sections of Chapter 5, the validity of using indicators as proxies to assess efficiency is questioned, such as the proportion of SOBs' lending in total bank lending and the proportion of SOEs' in total credit allocations. In doing this, financial performance and productivity between SOEs and non-SOEs, and several key performance indicators between SOBs and non-SOBs, are examined. The findings include, first, that SOEs' institutions, productivity, and contributions to long-term *economic growth* exceeded that of non-SOEs, especially after the *Zhua Da Fang Xiao* reform in 1998. At the same time, the *financial performance* of the SOEs became comparable to the non-SOEs. Second, capital adequacy ratio (CAR),

non-performing loans (NPLs), and profitability analyses all suggest the SOBs moved into a better financial position starting in 2003, with the introduction of public listing reforms. Third, based on the previous two findings, it is argued that it is clearly inadequate to estimate allocative efficiency of China's financial system by emphasizing a more efficient non-state sector. Fourth, SOBs' current lending to SOEs cannot be considered inefficient, given that more market-conforming attributes became embodied in both SOEs and SOBs.

In the rest of Chapter 5, two alternative methods are used to measure and observe allocative efficiency. The first method found a smoother credit growth trend through high allocative efficiency, which assumes that the deviation of credit expansion from market-clear level is a reflection of allocative inefficiency. The second method measured the efficiency of investment via the proxy of incremental capital-out ratio (ICOR). Both measurements indicate a process of allocative efficiency over the course of the financial reforms.

In Chapters 6 and 7, financial development via interactive relationships between savings and investment and then between banking deposits and banking loans are reviewed at the macro-level. In Chapter 6, a comprehensive picture of the structure, composition, and state attributes lays the foundation for the analysis in Chapter 7. It is found that there is an observable decrease in the influence of state attributes from both the supply and demand sides of financial resources.

Chapter 7 discusses the synthesis of the allocative efficiency view of financial development and the productive efficiency view of finance. This allows for a single unified and consistent framework. By approaching the assessment via the

aggregate-level savings–investment balance and deposit–loans balance, two periods, pre- and post-1995, were found to represent different interactions of the above two efficiencies. Productive efficiency in the pre-1995 period emphasized the function of credit creation in the financial system, at a cost of efficiency loss in investment and instability in delivering economic growth. Conversely, allocative efficiency received greater attention post-1995. Emphasizing the interactions between these two efficiency attributes, it is argued that although the financial system generated both efficiencies at the same time, policy-makers could emphasize one over the other across time, largely determined by the condition of the real economy.

This analysis is further tested via provincial-level panel regressions and the panel error correction model (ECM) to draw on cross-regional capital mobility and the inverse causal relationship between savings and investment, emphasized by the two efficiencies. Two conclusions are drawn from these econometric tests. First, it is found that pre-1995, when productive efficiency dominated, can be characterized as a period with more effective aggregate supply and effective demand coordination, but less efficient resource allocation. For the post-1995 period, when reforms focused on improved allocative efficiency, reverse attributes are found. Second, according to the results from the panel ECM estimation, a bilateral causal relationship between savings and investment, in both short-term dynamics and long-term equilibrium, was found. On the one hand these findings verify the feasibility and applicability of both theoretical perspectives under the Chinese context; on the other hand, the results suggest a complementary, not a strictly substitutive, relationship between allocative and productive efficiencies. This shows the existence of potential trade-offs between either efficiency.

Additional empirical tests are conducted in Chapter 8, where the roles of capital accumulation in China's economic development, investment efficiency in capital accumulation, financial development in investment and investment efficiency, and financial development in overall economic growth are tested to verify the analyses in this thesis. In the time-series models, it is found, first, that capital accumulation was the driving force behind China's growth performance. However, the embodied technological progress and induced productivity enhancements during the process of capital accumulation—the expansion of investment—tended to be limited. Second, the results suggest a negative correlation between financial development and investment efficiency, where financial deepening and financial liberalization measure financial development. It is further found that monetary expansion, measured by money supply and banking credit provision, generated strong positive effects on capital accumulation. However, the effects from financial liberalization, measured by the constructed FRI, remained insignificant and limited.

Based on the panel GMM (generalized method of moments) technique, the empirical relationship between financial development and economic growth in China is analyzed. Three indicators, Size, Intermediation, Liberalization, are used to capture the effects of the regressions. It is found that, first, all traditional indicators of the size of financial development report negative correlations with economic growth. It is through the distortion of investment efficiency, that is allocative inefficiency, that the expansion of the scale of the financial sector negatively affects economic growth. Second, the major positive effects that financial development had on economic growth is through coordination of deposits and loans and of savings and investment. This implies the positive effects of credit expansion on growth was through successfully integrating aggregate supply and effective demand. Third, the effect of overall financial repression

on growth determination remains unclear. However, the indicator that measures the substitution of loans to budgetary expenditure in fixed investment found a positive connection between less state intervention in the financial sector and increased economic growth.

This thesis assesses the evolving interactions between China's financial reforms and economic development over the past 30 years by examining the applicability and feasibility of competing theoretical perspectives under the context of China. Drawing on the aspects of monetization, financial liberalization, allocative efficiency in the neoclassical doctrine, and productive efficiency in the Keynesian-Schumpeterian view of endogenous credit creation, it is argued that, as a transitional economy where strong market-supplanting attributes remain, comparing China's financial development and its interactive role with real sector development with pure market criteria leads to certain biases. Using the synthesized analytical framework, financial deepening, financial liberalization, and the allocative efficiency of finance can only explain some parts of China's financial governance and financial arrangements. Particular functions of the financial system—credit creation and related efficiency attributes (productive efficiency)—are not accounted for in the three above dimensions. Throughout this analysis, substantial evidence is found to illustrate the positive effects on economic growth that originated with productive efficiency over financial reform. It is argued that it is the complementarity of the productive efficiency with allocative efficiency that explains the seemingly confusing phenomenon that an inefficient financial system, according to purely commercial criteria, can successfully support China's economic development.

9.3 Limitation of the thesis and prospects for future research

While many of this research's limitations have been overcome, the results of this study can be improved. First, in this study several alternative methodologies are used to study the efficiency attributes of China's financial system. However, by taking a financial-only perspective, the outcome of these estimators may be affected and explained by factors other than financial development. Therefore, the first suggestion for future research is to consider the micro-foundations of these competing theoretical perspectives and place them under a unified analytical framework; for example, linking microeconomic models in neoclassical endogenous growth doctrine with models from the monetary or financial circuit theories in the post-Keynesian school of thought.

In this study, SOBs comprised three policy banks and the four, fully state-controlled banks. However, in looking at owners' equity of joint-stock commercial banks (JSCBs) and city commercial banks (CCBs), it is found that the majority shareholders in these banks are still local governments and large SOEs. Being aware of the conflict of interests between the central and local governments, as well the conflict of interests between the state sector and market criteria, it is argued that the marginal effects of state ownership on performances could be important when studying China's financial institutions in different forms. Furthermore, the share of state ownership in financial institutions is not the same as the share of state influence. Therefore, a second suggestion for future research is to consider a more detailed classification of state influence when analyzing China's financial institutions, so as to distinguish the differences among state influences, for example, how to quantify the insurance effects from the state government or how to quantify the actual equity share of the state in total owners' equity in financial institutions.

Also in this study, only the conflict of interests between the central and local governments is considered. It can be argued that conflicts of interests among different bodies of the central government exist throughout the financial reforms. That is to say, the interests of the fiscal department (the Ministry of Finance), the monetary authority (the People's Banks of China), and the regulatory bodies (China Banking Regulatory Commission, China Securities Regulatory Commission, and China Insurance Regulatory Commission) could be largely different. To a certain degree, the actual reform path of China's financial sector could be the result of a compromise among these organizations (see Shih, 2008; Bell & Feng, 2013). Given this possibility, the third and the final suggestion for future research is to construct a more comprehensive analytical framework, with the consideration of the conflicting interests among different state and non-state bodies that involved in China's economic and financial reform.

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